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PRINCIPLES

OF

ANATOMY

AND

PHYSIOLOGY.

BY

JOHN AITKEN, M. D.

FELLOW OF THE ROYAL COLLEGE OF SURGEONS,
MEMBER OF THE ROYAL MEDICAL, PHYSICAL, AND
ANTIQUARIAN SOCIETIES,
ONE OF THE SURGEONS OF THE ROYAL INFIRMARY,
LECTURER ON ANATOMY, SURGERY, AND MIDWIFERY,
AND HONORARY PRESIDENT OF THE CHIRURGO-
OBSTETRICAL SOCIETY OF EDINBURGH.

FOR THE USE OF STUDENTS.

Who can paint like Nature? THOMSON.

VOL. I.

LONDON:
Printed for J. MURRAY, Fleet-Street.
MDCCLXXXVI.

PREFACE.

NOTWITHSTANDING the many valuable Works on Anatomy and Phyſiology already publiſhed, the Author of the following Treatiſe, after having delivered twenty-four public courſes of lectures on theſe ſciences, is humbly of opinion, that a Book exhibiting in a conciſe and perſpicuous manner their Principles or Rudiments, in words and figures, and of a very portable form ſo as to be adapted to the uſe of Students, is ſtill wanting. Experience muſt determine how far his performance is calculated to ſupply the defect.

THE verbal diſcriptions are plain and ſimple, and illuſtrated by a ſyſtem of Engravings, either copied from NATURE, or ſelected from the works or the firſt Anatomiſts, which on account of their high price, are in a great meaſure locked up and unknown, *viz.* SUE, HUNTER, CHESELDEN, RUYSCH, ALBINUS, HALLER, CAMPER, MONRO, LE CAT, WERNER, FELLER and BIDLOO, WALTER, HEWSON, SHELDON, MUSCAGNI, *&c.* None of the figures are diminiſhed, and many of them are of the natural ſize.

THE Lymphatic Syſtem, which greatly engages Anatomiſts at preſent, has been particularly attended to.

IT is the Author's anxious wiſh to facilitate the ſtudy of anatomy, which is confeſſedly the foundation of medicine, by thus giving an elementary, comprehenſive, and cheap view of it; therefore in the plates accuracy and utility have been more conſulted than ornament.

The importance of the practical remarks in Surgery, (a ſcience of which the Author is peculiarly fond) is too obvious to require any commentary.

In the Phyſiology conciſeneſs has been particularly aimed at; the principles are few and ſimple, the deductions, it is preſumed, are in general ſupported by facts, and juſtified by anatomy.

Upon the whole the Author hopes for indulgence, on accouut of the difficulty of the undertaking. Miſtakes and omiſſions, from which no ſcientific performance of great detail can be entirely free, ſhall be candidly acknowledged, and carefully corrected and ſupplied, and for this purpoſe communication are earneſtly ſolicited.

Edinburgh Anatomical Theatre,
1ſt. Nov. 1786.

Erratum. For *various* read *venous* in P. 147.

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PRINCIPLES OF ANATOMY.

INTRODUCTION.

ANATOMY is the art of ſeparating and demonſtrating the parts of an animal or organized body, by diſſection or other means; and a perſon capable of doing ſo is an *anatomiſt*.

An animal conſiſts of *ſolids* and *fluids;* of the laſt, the common maſs is the *blood*.

The ſolids are chiefly made up of *fibres*, or thread-like ſubſtances, diſcovered by diſſection, tearing, maceration, &c.

The fibres are as various as the parts they form.

The principal component parts are

1 Bones,
2 Cartilages or griſtles,
3 Ligaments,
4 Muſcles,
5 Tendons,
6 Nerves,
7 Membranes.

1. *Bone.*

Bone (os) is white, brittle, and inſenſible. A deſcription of the bones or oſſeous ſyſtem is *oſteology.*

2. *Cartilage.*

Cartilage (cartilago) is white, elaſtic, and obſcurely ſenſible : A deſcription of the cartilages, or cartilaginous ſyſtem, is *chondriology.*

3. *Ligaments.*

Ligament (ligamentum) is white, ſomewhat elaſtic, obſcurely ſenſible, and chiefly ſubſervient to the joints. The ligaments are the ſubject of *ſyndeſmology.*

4. *Muſcle.*

Muſcle (muſculus) vulgarly termed fleſh, is exquiſitely contractile and ſenſible, and generally red : A deſcription of all its parcels or muſcular ſyſtem is *myology.*

5. *Tendon.*

Tendon (tendo) approaches to the conſiſtence of ligament and cartilage, not contractile, ſeemingly inſenſible, generally round like a cord, ſometimes of a web-like form (aponeuroſis) and conſtantly connected to muſcle, and therefore deſcribed in the myology.

6. *Nerve.*

Nerve (nervus, &c.) is white, ſoft, and obſcurely ſenſible, except at its extremities.

The nervous ſyſtem, the ſubject of *neurology*, conſiſts of the brain (ſenſorium commune), ſpinal marrow (medulla ſpinalis), and nerves or cord-like productions, diſperſed in pairs to the other parts. Ten go off from the brain, and thirty from the ſpinal marrow.

7. *Membrane.*

Membrane (Membrana, tela) is a web-like expanſion, almoſt inſenſible, from its office or the parts it covers, named integument, tunic, coat, dura mater, pia mater, pleura, peritonœum, perioſteum, perichondrium, &c.

When membrane aſſumes a burſal and tubular form, it produces veſicæ or cyſts, vaginæ or ſheaths, ductus or canals; and if muſcle be ſuperadded, viſcera or bowels, (the ſubject of *ſplanchnology*), vas or veſſel, or vaſcular ſyſtem are formed.

The *heart* is the center of the vaſcular ſyſtem; the tubes or veſſels through which the blood is tranſmitted to all the organs, are *arteries* or *arterial ſyſtem;* thoſe, which return the blood, are *veins* or *venous ſyſtem;* their hiſtory is *angiology.*

Some arterial branches terminate in a convoluted manner, more or leſs intricate, and form numerous and variouſly ſized maſſes, named *glands* or *glandular ſyſtem;* the ſubject of *adenology.*

Theſe parts are ſimultaneouſly formed and gradually expanded and intermixed with one another, ſo that it is difficult to mark their limits: A conciſe deſcription of each may be attempted.

OSTEOLOGY.

YOUNG bone is ſoft, membranous, very flexible, and vaſcular; notwithſtanding that, when mature or perfect, it becomes the moſt rigid and ſolid part: This change, which takes place ſlowly, is named *oſſification*, and its hiſtory *oſteogeny*.

Oſſification depends much on the depoſition and concretion of a peculiar matter of an earthy nature, named oſſeous, which proportionally deſtroys the pliancy and veſſels of the young bone.

In the broad, or flat bones, oſſification begins in one or more points, and proceeds like rays to the margins: Theſe beginnings are named *nuclei*. In the long and roundiſh ones, it is diſcerned in the middle and extremities at the ſame time, in circular lines or rings.

The middle oſſification forms the *body* of the bone; the extreme ones, while unconnected by concretion with the middle one, are called *epiphyſes;* but, when united by oſſification, they are named *apophyſes* or *proceſſus*.

The proceſſes are not all produced in this manner. They are very numerous, giving convenient attachment to muſcles, ligaments, &c. and, from circumſtances, named angular, ſtyloid, maſtoid, coronoid, odontoid, ſpinous, tranſverſe, condyloid, trachanters, &c.

In the bones are many remarkable holes (foramina), from ſhape, uſe, ſize, &c. denominated optic, occipital, thyroid, great, &c. alſo proper, when formed in one bone, and common, when placed between two.

Numerous cavities, hollows, or depreſſions (foſſæ), furrows, grooves, channels (ductus), are obſervable, called, on various accounts, articular, glenoid, cotyloid, &c. Many of them are cauſed by the preſſure of contiguous parts.

The external part of a bone is compact and comparatively ſolid, and compoſed of plates or layers (ſtrata, laminæ). This may be called *laminated.* The internal portion is ſpongy and cellular, and, as it ſomewhat reſembles *lettice-work* (cancelli), it may be named *cancellated;* in the broad bones of the head it is called *meditullium* and *diploe*, and the laminated parts are named external and internal *tables;* the laſt by ſome is termed *vitreous.*

The cancellated parts ſupport a delicate membrane, formed into cells, and containing marrow or oil (medulla). It has been called perioſteum internum, although neither ſimilar to the perioſteum in office nor ſtructure.

This membrane ſeems to be the ſeat of *ſpina ventoſa*, which is an inflammation often deſtroying the laminated part of the bone, unleſs its progreſs be checked by a timely perforation by the trepan *.

The ſtrength of any bone ſeems to be as its diameter, ſubſtance, and length.

The oſſeous ſyſtem in connection is named *ſkeleton*, conſiſting of head, trunk, and extremities;

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* See Syſtematic Elements of Surgery.

mities; and may be compared to a column, the trunk repreſenting the baſe and ſhaft, and the head the capital. The ſuperior extremities, or arms, and the inferior, or legs, muſt, in this view, be regarded as appendages.

All the bones, as well as other parts ſituated in the axis of the body, or divided by a plane cutting the body longitudinally into halves, from the fore to the back part, are *ſingle*, *adzygous*, or *marrowleſs;* but at the ſame time *ſymmetrical;* while all the others; with little exception, are diſpoſed in pairs, and each piece perfectly *ſimilar* to its fellow.

The particular oſteology may begin with the bones of the head, and proceed downwards.

Of the Bones of the Head.

The head of the ſkeleton conſiſts of the *cranium*, *ſkull*, or *brain-caſe*, and a ſculptured portion attached to the fore and under part of the ſkull, viz. the bones of the face, diſtinguiſhed above from the ſkull by the orbits or eye-ſockets, and divided tranſverſely by the mouth into the upper and under jaws.

The ſkull is univerſally of an oval or egg-like ſhape; in ſome caſes it is ſaid to approach to the round form. The ſmall extremity is turned forwards, and is the *front*, or *fore-head* (ſinciput), the other backwards, and is the *hind-head* (occiput), a middle point is the *crown* (vertex), the lateral flattened portions are the *temples* (tempora).

The external ſuperior ſurface is ſmooth; the inferior, or baſe, abounds with proceſſes, cavities, and holes.

The internal ſuperior ſurface is leſs ſmooth than the external one, abounding with pits and ſmall holes penetrating the inner table. It is equally divided into lateral portions, by a ridge or ſpine on the fore and back parts, and in the middle by a ſhallow groove. The inferior part is exceedingly unequal, preſenting three pairs of *cavities*, termed *anterior*, *middle*, and *poſterior*, exactly correſponding to the lobes of the ſenſorium.

The ſmooth and equable ſtructure of the upper ſegment of the ſkull is favourable for trepaning, the places of the ſpines excepted; and as the diploe, eſpecially in the pits, is ſometimes, or rather often, wanting, the ſurgeon is, in every caſe, to proceed cautiouſly.

During youth, the ſkull conſiſts of eight principal bones, viz.

Frontal, or os frontis;
Two parietal, or oſſa parietalia;
Occipital, or os occipitis;
Two temporal, or oſſa temporum;
Ethmoidal, or os ethmoides;
Sphenoidal, or os ſphenoides.

Theſe bones are connected by *ſeven ſutures*, or by ſeven portions of ſuture, that is, a ſeam-like joining, formed by the meeting of the oppoſite oſſifications, and ſomewhat reſembling dove-tailing.

1. Coronal (ſutura coronalis), extending from temple to temple, and connecting the frontal and parietal bones.

2. Lamdoidal (ſutura lamdoidalis) extending from behind the ear of one ſide to the correſponding point of the other ſide.

3. Sagittal (ſutura ſagittalis) lying longitudinally between the coronal and lamdoidal ſutures, like an arrow between the ſtring and bow *.

4. and 5. Temporal (ſuturae temporales) one on each ſide, connecting the temporal and parietal bones, they are called *ſquammous* and *falſe*, their form being peculiar †.

6. Ethmoidal (ſutura ethmoidalis) ſurrounding the ethmodial bone.

7. Sphenoidal (ſutura ſphenoidalis) connecting the ſphenoidal to the adjacent bones.

Theſe ſutures are not complete in infancy. After maturity they are obliterated, ſo that the ſkull is formed by one piece.

They favour the equable diſtenſion or enlargement of the ſkull; and permit the neceſſary change of ſhape during parturition, and contribute to protection.

Frontal Bone.

This bone is ſomewhat like one half of the ſhell of the cockle; it is placed between the anterior extremities of the parietal bones and the face, and ſupports the brow; it is adzygous.

The outer ſurface is convex and ſmooth; the inner is leſs equal, and is divided into lateral halves by *a ſpine*, which gradually diſappears about the middle of the forehead; to it the fore part of the *falx* of the dura mater is attached. It admits not with ſafety the application of the trepan,

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* In the young ſubject the oſſification is not complete at the extremities of this ſuture, eſpecially the anterior one; theſe are called *openings* of the head (fontænellae, bregmata). It is ſometimes continued through the frontal bone to the root of the noſe.

† Two temporal ſutures have been diſcovered on one ſide.

pan, and therefore deſerves to be well marked by ſurgeons.

On the under part of the anterior extremity are two concave plates, divided by a large opening, which is ſometimes a hole; theſe are the upper portions of the orbits, and therefore named *orbitar* proceſſes.

Each orbitar proceſs is ſeparated from the forehead by an arched ſpine or ridge, which forms the eye-brow (ſupercilium), therefore named *ſuperciliary* proceſs; the terminations of which being at the angles of the orbit, are *orbitar* proceſſes, external and internal.

Between the internal orbitar proceſſes is a projection, which ſupports the bones of the noſe, named *naſal* proceſs.

Behind each external orbitar proceſs, the bone is hollowed, to make a part of the temporal cavities (foſſæ).

A little above each internal orbitar proceſs, the tables are ſeparated, to form two cavities, named *frontal ſinuſſes*, communicating ſometimes with one another, but always with the noſe, of which they make a part. They are diſtinguiſhable externally by correſponding protuberances.

When theſe contain morbid fluid or animals, they may be very ſafely opened by a ſmall trepan.

In each ſuperciliary proceſs there is either a hole or notch, which tranſmits a ſmall artery and branch of nerve from the orbit to the forehead.

Towards the noſe, and near the bottom of each orbitar proceſs, are two ſmall holes, named *external* and *internal orbitar holes;* one of them is frequently common to this bone and the ethmoidal.

On the orbitar proceſs, near the external angular one, is a cavity for lodging the lachrymal gland.

Parietal Bones.

Theſe are ſimilar to one another; by the ſagittal ſuture their edges are joined together, and internally form a ſhallow groove for the ſuperior longitudinal ſinus of the dura mater, which may be avoided in trepanning, if circumſtances permit, on account of the riſk of wounding the ſinus.

Each is convex and ſmooth externally, and concave and leſs ſmooth internally, carrying pits and furrows made by the brain and veſſels, which require caution in trepanning.

The four angles of each have been called proceſſes, viz. anterior ſuperior, anterior inferior; poſterior ſuperior, poſterior inferior.

The edge which correſponds to the temporal bone is of a creſcent form, the concavity is turned to that bone.

Near the poſterior ſuperior angles is a ſmall hole in each, which admit veins going from without to the ſuperior longitudinal ſinus.

Occipital Bone.

This is an adzygous bone, and is a counterpart to the frontal one.

The external convex ſurface is ſmooth on the upper part; on account of the attachment of the muſcles of the back and neck to the under part, it is there unequal.

The internal concave ſurface carries two ſpines, which croſs at right angles nearly; the upper half of the vertical one is within the reach of the trepan, but ought to be avoided like the frontal ſpine.

Theſe croſſing ſpines form four cavities or foſſæ; the upper two contain the poſterior lobes of the cerebrum ; and the lower the cerebellum, divided into two lobes.

A groove is marked on the ſide of the upper part of the vertcial ſpine, which divides into two, and accompanies the tranſverſe ſpine for lodging the poſterior part of the longitudinal, and the *two lateral ſinuſſes* of the dura mater.

A large hole, named *occipital*, ſlops a little backward, and allows the ſpinal marrow, &c. to be tranſmitted.

Before this hole, a proceſs, named *cuneiform*, is placed, a little hollowed above ; it joins with the body of the ſphenoidal bone, and is placed obliquely ; near the anterior part of the occipital hole are two proceſſes, named *condyles*, covered with cartilage ; they are received into the firſt bone of the neck.

One, ſometimes two holes, above each condyle, paſſing obliquely forwards, tranſmit the *ninth pair* of nerves ; and one behind each allow veins to reach the lateral ſinuſſes.

Temporal Bones.

One on each ſide oppoſite to one another, form, at ſame time, part of the ſides and baſe of the ſkull.

The upper thin and circular portion is ſhaped like a ſcale of a fiſh, and called *os ſquammoſum.*

The under portion, which is thick and triangular, and ſtands obliquely forwards, making the partition between the middle and poſterior cavities of the baſe of the ſkull, is *os petroſum.*

The poſterior portion, hollowed internally, and covering a deep groove, part of that of the lateral ſinus, is *occipital angle ;* and completes the poſterior cavities of the baſe of the ſkull.

From the anterior and lateral part a ſlender long proceſs ſtands forwards horizontally, named *zygomatic;* becauſe, with another from the face, an arch, called *zygoma*, or *yoke*, is formed, and can be perceived before the ear in the entire ſubject.

From the poſterior and lateral part, a ſhort thick nipple-like proceſs points downwards, called *maſtoid;* to which the ſuperior end of the *ſterno-cleido-maſtoid* muſcle is fixed, and can be felt behind the ear without diſſection.

A proceſs, reſembling the ſpur of a cock, ſtands downwards inwards, and a little forwards; it has been compared to the ſtile or pen of the ancients, and named *ſtyloid:* Three ſmall muſcles are fixed to this, and derive part of their names from it.

The root of the ſtyloid proceſs is covered with a proceſs compared to a ſheath, and named *vaginal.*

From the maſtoid, extending to the ſtyloid proceſs, is the border of a funnel-like hole, called *auditory* proceſs; becauſe the hole is the *external paſſage to the ear* (meatus auditorius externus): To this proceſs the cartilaginous part of the ear is attached.

The external paſſage of the ear inclines almoſt directly inwards, and a little downwards: Its termination is wideſt; and, in the freſh ſubject, divided from it by a membrane; the cavity within the membrane is *drum of the ear* (tympanum), to which a paſſage leads from behind the noſtrils, called therefore the *paſſage from the palate to the ear* (iter a palato ad aurem): This is lengthened by a cartilaginous trumpet-like end, named, on this account, *tube, and Euſtachian tube* (tuba Euſtachiana).

The drum contains four ſmall bones, and allows the *ſeventh pair* of nerves, the inſtrument of hearing, to be ſpread out and protected. The nerve is admitted through an *oval hole* in the anterior ſurface of the petrous portion, that is divided into ſmall perforations, and named *internal paſſage to the ear* (meatus auditorius internus).

The ſeventh nerve is double; that part of it which hears is ſoft (portio mollis); the other is comparatively firm (portio dura), and paſſes outwards, to be beſtowed on the external parts, by a ſmall round hole behind the root of the ſtyloid proceſs, named therefore *ſtylo-maſtoid*, and *aqueduct of Fallopius*.

Through the inferior part of the petrous portion, a large round hole goes upwards, and then bends forwards, and opens into the cavity of the ſkull, at the extremity of the bone: It is called *carotid hole*, becauſe it tranſmits the internal carotid artery to the brain. Its proximity to the ear gives a ſounding, or ſenſation of noiſe, when the blood's motion is rapid and ſtrong, as in fever, &c.

On the under ſurface of the petrous portion is a *thimble-like* or *digital* cavity, that lodges the top of the internal jugular vein, which begins from the lateral ſinus of the dura mater, thro' a hole common to the occipital and temporal bones, named *foramen lacerum*, through which alſo, but a little more inwards, is tranſmitted the *eighth pair* of nerves, called, from its long courſe, *par vagum*.

Behind the root of the zygomatic proceſs is a cavity, incruſted with cartilage, in the recent body, which receives the condyle of the lower jawbone, and allows it to play forwards and backwards: It may be called *maxillary*.

A groove behind the maſtoid proceſs is formed by the extremity of the *digaſtric* muſcle.

Beſides the holes and cavities mentioned, the petrous portion contains *canals*, named *ſemicircular*, and other cavities which belong to the ear.

The ſquammous portion admits of trepanning. It ought however to be cautiouſly executed, becauſe the inner ſurface abounds with inequalities, cauſed by the convolutions of the brain.

Hæmorrhage from the ear is juſtly regarded by ſurgeons as a bad ſymptom, after violence has been applied to the ſkull; becauſe it ſhews the violence to have been ſo conſiderable as to have ruptured the veſſels, if not fractured the bone.

The ſquammous ſuture ſeems finally intended to ſupport the contiguous parietal bone, and is not the effect of the action of the temporal muſcle.

The flatneſs of the temples favours hearing, and extends the ſphere of viſion.

Ethmoidal Bone.

This ſomewhat reſembles a cube.

That portion which is ſeen from the cavity of the ſkull, fills up the void between the orbitar proceſſes of the frontal bone, completes the anterior part of the baſe of the ſkull, and has many perforations, like a ſieve, is called *cribriform* plate: The *olfactory*, ſmelling, or *firſt* pair of nerves are tranſmitted through it to the noſe.

From the upper part of the cribriform portion, a proceſs like a cock's comb ſtands upwards, therefore named *criſta galli:* To it, and to a *blind hole* (foramen cœcum) at the anterior point of its root, the fore part of the falx is fixed.

On the outer and under ſide of this portion a plate hangs down, and is part of the partition of the noſtrils. It is called *naſal proceſs*, or lamella.

On each ſide of the naſal lamella, a cellular maſs depends, and, by a ſmooth ſurface, named *os planum*, contributes to form the orbit; ſo that theſe ſurfaces mark the exact diſtance of the eyeballs from each other.

The cells communicate among themſelves and with the frontal ſinuſſes and naſal cavity.

From the under part of the cells, on each ſide, a convoluted *ſpongy proceſs* hangs down, named *ſuperior ſpongy bones*, (oſſa ſpongioſa ſuperiora).

The brain may be readily wounded through the cribriform plate of this bone: The cellular part is delicate, and, when ulcerated, is of difficult cure, and affects the eye.

Sphenoidal Bone.

This completes the middle of the baſe of the ſkull, and joins with the other bones, ſomewhat like a wedge, hence its name: It is adzygous.

The body is placed between the cunieform proceſs of the occipital bone and the frontal one: On its inſide or upper part, are *four* points turned to one another, and ſomewhat incloſing a cavity compared to a bed; hence named anterior and poſterior *clinoid* proceſſes. The cavity is called *ſella turcica*, from its being like a Turkiſh ſaddle; it lodges a part of the brain, named *pituitary gland*, (glandula pituitaria).

The roots of the anterior clinoid proceſſes are widened forwards, and terminate laterally in ſharp points, named *tranſverſe ſpinous proceſſes*.

From the anterior and ſomewhat inferior part of the body, a ſolitary proceſs points forwards, and contributes to form the partition of the noſtrils; it is named *adzygous* or *naſal.*

The body contains two *ſinuſſes*, which are a part of the noſe, and are open forwards: They are named *ſphenoidal.*

Each ſide of the body ſends out a portion, which is conſidered as four proceſſes:

1. *Temporal*, its extremity, becauſe it completes the temporal cavity.

2. *Orbitar*, its fore part gently hollow, being a ſhare of the orbit.

3. *Spinous*, the backmoſt ſharp point.

4. *Pterygoid*, depending from its under part near the body.

The interſtice of the pterygoid proceſſes is the width of the opening of the noſtrils backwards.

Each pterygoid proceſs terminates by a broad and narrow portion, named wings or alæ; the broad is *external:* The ſpace between them faces backwards, and is called pterygoid foſſa or cavity.

The *pterygoid* muſcles of the lower jaw are attached to theſe alæ.

The innermoſt ala is longeſt, and has a hook-like point, over which the *circumflexus* muſcle paſſes to the palate.

At the inſide of the root of each anterior clinoid proceſs a round hole ſlants forwards and outwards, named *optic*, becauſe they tranſmit the *ſecond* pair, the optic or ſeeing nerves, to the bottom of the orbits, to form the eyes.

Between the tranſverſe ſpinous proceſs and the lateral portion, a long ſlit is formed into a hole by the frontal bone, called *ſuperior orbitar fiſſure*, to diſtinguiſh it from another which opens into the orbit from the temporal foſſa.

Through theſe fiſſures, nerves, and veſſels, are tranſmitted, particularly the *ſecond*, *third*, *fourth*, *firſt branches of the fifth*, and *ſixth* pairs of nerves.

Below the inferior extremity of each fiſſure a round hole runs horizontally forwards, for the *ſecond branches* of the *fifth* pair of nerves, called *ſuperior maxillary*, becauſe they go to the upper jaw.

At the root of each ſpinous proceſs is an oval hole, that tranſmit the *third branches* of the *fifth* pair of nerves to the lower jaw, named *inferior maxillary*.

In each ſpinous proceſs, near the point, is a ſmall round hole; theſe give paſſage to two arteries from the external carotids to the dura mater: They may be called *ſpinous*.

At each ſide of the body, and proceeding horizontally forwards to the noſe, is a ſmall hole, called *pterigoidean* or *Vidian;* they tranſmit two arteries. Theſe are not ſeen till the bone be detached.

Beſides theſe eight bones, there are others leſs conſiderable, principally found in the courſe of the lambdoidal ſuture, like little iſlands, each ſurrounded by its ſuture. They are called *oſſa triquetra* and *Wormiana*.

They are oſſifications which had commenced before the adjacent larger ones had been completed.

They may be miſtaken by the ſurgeon, not aware, for fractures: As the ſurrounding ſutures are as cloſe as any others; it is folly to expect any uncommon diſcharge from the interior parts, in conſequence of iſſues planted on or near them.

All the bones of the ſkull, in their mutual connection, exhibit ſtriking inſtances of the conſumate ſkill of Nature's Architect.

The Upper Jaw.

This conſiſts of thirteen bones, twelve of them are in pairs, viz.

Maxillary bones, or oſſa maxillaria ſuperiora.
Naſal bones, or oſſa naſi.
Cheek bones, or oſſa malarum.
Nail bones, or oſſa unguium.
Palate bones, or oſſa palati.
Inferior ſpongy bones, or oſſa ſpongioſa inferiora, or oſſa turbinata inferiora.
The Vomer.

Maxillary Bones.

Theſe form the greateſt ſhare of the upper jaw.

From the upper part a pointed proceſs riſes up to the frontal bone, and helps to complete the noſe; therefore called *naſal* proceſs.

From the root of the naſal proceſs a thin broad plate is extended backwards, ſlightly hollow, belonging to the orbit, and is orbitar proceſs.

The inferior edge is ſomewhat circular and thick, and contains eight holes or ſockets for the teeth; on this account named *alveolary* proceſs.

The laminated portions on each ſide of the ſockets, being nearly of the ſame thickneſs and ſtrength, give the Dentiſt a diſcretional power to draw a tooth in the outward or inward direction, as other circumſtances may render proper.*

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* See Syſtematic Elements of Surgery.

The back end of the alveolary proceſs is ſomewhat bulbous and rounded, and named *tuberoſity*.

From the root of the alveolary proceſs, on the inſide, a plate a little hollowed on each ſurface, ſtands horizontally inwards, and with its fellow forms a large ſhare of the roof of the mouth; therefore named *palatal proceſs*, and is at once the *roof* of the mouth and *floor* of the noſe.

When any part of this is natively deficient, or deſtroyed by diſeaſe, (the venereal one) it opens an inconvenient communication, greatly impeding ſucking, ſwallowing, and ſpeaking.

The edge of the palatal proceſs, which joins to the correſponding one, is broad and rough, to favour their firm coheſion, and to ſecure the partition of the noſtrils.

At the fore part of the root of the naſal proceſs is a notch, which makes the anterior aperture of the noſtril.*

On the outſide, and above the middle of the alveolary proceſs, is a rough hollow,. with a projecting edge, to receive the cheek bone; therefore called *malar* proceſs.

Between the orbitar proceſs and upper part of the alveolary one, is a large *hollow* or *ſinus*, with a conſiderable orifice turned to the noſe; it is called *ſinus maxillaris* and *antrum Highmorianum*. It is of the ſame nature with the frontal and ſphenoidal ones. It occupies the whole of the body of the bone.

From a point immediately below the malar proceſs, or from the adjacent ſocket, a *perforation* may be made into this ſinus to diſcharge matter, when the natural orifice is obſtructed : The matter otherwiſe deſtroys the bone, eſpecially the orbitar plate, and produces much diſtreſs and deformity. A ſmall trepan may be employed for this purpoſe *.

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* The poſterior as well as anterior noſtrils may be plugged up, and thus the hæmorrhage called epiſtaxis, may be ſuppreſſed by the ſurgeon, dextrous and well acquainted with the parts.

Between the naſal proceſs and the orbitar one is a large ſhare of a canal that inclines downwards and backwards to the floor of the noſe, and contains a part of the lachrymal duct.

This deſerves much attention from ſurgeons, becauſe it is liable to obſtruction, and requires operation *.

From the poſterior edge of the orbitar plate, a hole, or rather canal, ſweeps outwards and forwards, and opens on the fore part of the bone by a conſiderable orifice, called *external orbitar foramen;* it tranſmits nerves and veſſels to the teeth and face.

Immediately within the anterior end of the alveolary proceſs, is a ſhare of a blind hole, named *inciſive* (foramen inciſivum) becauſe near the teeth ſo called.

Naſal Bones.

Theſe are ſmall, and, when joined, make an arch ſomewhat like the back of a ſaddle, which reſts on the frontal bone, and fills up the interſtice between the naſal proceſſes of the maxillary bones, and are the *bridge of the noſe.* Their inferior ends are thin and unequal, to be connected with the cartilaginous part of the noſe.

Cheek Bones.

Each is ſomewhat of a ſquare figure ; the upper ſide exhibits a circular notch, and is a part of the brim of the orbit; the ends of which are *ſuperior and inferior orbitar proceſſes:* The anterior ſide is *maxillary proceſs;* becauſe it is fixed in the malar proceſs of the maxillary bone: Part of the poſterior ſide is *zygomatic* proceſs, and is joined to that of the temporal bone, which ſeems to be intended rather to ſupport the face than protect the temporal muſcle. A proceſs projects inwardly, and forms a ſhare of the orbit, that may be named *internal orbitar.*

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* See Syſtematic Elements of Surgery.

A ſmall hole paſſes from the orbitar proceſs to the face.

Oſſa Unguium.

Theſe bones have their names from their reſembling the nail of the finger. Each has two plates; one broad and ſlightly hollow, which may be named *orbitar proceſs*, becauſe it is a part of the orbit; the other is formed into a groove, and completes the lachrymal paſſage in the maxillary bone, it may therefore be named *lachrymal proceſs.* The proceſſes are ſeparated by an acute ſpine.

This bone is perforated in the operation for the fiſtula lachrymalis; and is liable to eroſion, from the proximity of venereal ulcers, either in the noſe or throat *.

Palate Bones.

Theſe are ſituated at the poſterior part of the palate and noſe. The ſquare and innermoſt portion, which, with its fellow, completes the palate, may be named *palatal* proceſs.

The pointed portion, which depends from the external edge of the palatal proceſs, and is connected with the pterygoid one, may be called *pterygoid proceſs.*

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* See Syſtematic Elements of Surgery.

The unequal plate that runs up the ſide of the naſal cavity, is *naſal proceſs.*

Upon the point of this laſt is a ſmall hollow ſurface, which is a part of the orbit, and may be named *orbitar proceſs.*

The palatal parts of theſe bones, deficient or deſtroyed, produce the effects of a like condition of the remainder of the roof of the mouth.

Inferior Spongy Bones.

Theſe are called inferior, to diſtinguiſh them from the ſuperior ones, or proceſſes of the ethmoidal bone: They are within the noſe.

Each lies horizontally, and is fixed to the internal ſurface of the naſal cavity, with its convexity turned to the partition; ſo that the orifice of the maxillary ſinus is *above*, while that of the lachrymal duct is *below* it.

Theſe bones contribute to extend the naſal ſurface.

They are often torn in raſh attempts to extract polypus by the forceps. Their ſoft texture renders them ſubject to ulceration and eroſion of the venereal kind; and accordingly they are ſometimes entirely deſtroyed*.

The Vomer.

This has its name from its reſembling ſomewhat the plough-ſhare. It has three edges. The *firſt*, with a deep ſocket in it, is turned upwards and backwards, and lodges the adzygous proceſs of the ſphenoidal bone: The *ſecond* inclines forwards,

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* See Syſtematic Elements of Surgery.

wards, and carries a long ſocket, or fiſſure, which admits the middle cartilage of the noſe: The *third* is downwards, and reſts in the furrow formed by the palatal proceſſes of the maxillary bones.

The vomer, thus deſcribed, is the bony part of the partition (ſeptum) of the noſe. It is very ſeldom placed exactly in the middle of the cavity: Nay, it ſometimes projects ſo much to the one ſide, that the ſurgeon muſt be careful leſt he miſtake it for a tumour.

When this bone is eaten by ſyphilis, partially or entirely, the cartilaginous part of the noſe loſes its ſupport, and, by ſinking, produces a moſt ſhocking deformity.

The Lower Jaw.

This is a ſtrong moveable arch, articulated with the temporal bones; the anterior part of the convexity is the *chin*.

The downward edge, ſomewhat rounded, is its *baſe*, and limits the face.

The terminations of the baſe, which are a little more forward than the ears, are called *angles;* within and near which many remarkable veſſels, &c. are ſituated.

The baſe, through its whole length, and the angles, are readily felt in the entire ſubject. This circumſtance enables the ſurgeon to aſcertain the ſtate of the bone, as to fracture, &c.

Oppoſite to the baſe is the *alveolary* border. It contains the ſockets of ſixteen teeth, correſponding to the border of the ſame name, and to the ſockets of the upper jaw.

This border is, for the moſt part, leſs extenſive than that of the upper jaw, by which it happens, that the under teeth, eſpecially the fore ones, fall within thoſe of the upper jaw. If a contrary diſpoſition take place, it gives a prominent chin, which is not a little uncouth.

The concavity of this jaw is ſomewhat increaſed towards the ſockets, by which the mouth is enlarged, and the laminated part is placed obliquely with reſpect to the teeth. This laſt circumſtance prevents the ſockets from being burſt ſo readily when the teeth are drawn in the inward as outward direction, although the plates themſelves are nearly of equal thickneſs.

Each extremity of the jaw is divided into two proceſſes. The anterior ones, placed a little without the line of the ſockets, flat and pointed, are *coronoid* proceſſes; the temporal muſcles are fixed to them. The poſterior are oblong, oblique knobs, covered with cartilage, named *condyles*, and lodged in the maxillary cavities of the temporal bones, with the interpoſition of a moveable cartilage in each. They ſeem to be a continuation of the angles turned obliquely upwards and backwards.

Within, and a little above each angle, is the orifice of a long canal, that extends to the chin, near which a ſmaller orifice communicates with it, but is not its termination.

Theſe canals tranſmit blood veſſels, and the third branch of the fifth pair of nerves, for the teeth and chin, which muſt be deſtroyed or much injured in diſeaſes, particularly *fracture*, of the lateral parts of this bone.

This jaw admits of depreſſion, by which the mouth is opened, and the condyles roll about their axes in their ſockets; in great degrees of it, they incline forwards, on the eminences at the zygomatic proceſſes, ſo as to endanger their ſlipping before them. This happens more or leſs in *luxation*,

ation, which may be on one or both ſides. In the firſt caſe, the mouth is open, and diſtorted to the luxated ſide; in the other, the gaping is greater, but without diſtortion. Properly depreſſing the condyles, ſo as to force them behind the eminences, gives *reduction.*

This jaw has a lateral motion, which, on account of its effects on the teeth, and interpoſed morſel, may be called *grinding*. It is very limited. The oblique poſition of the condyles favours this function.

The motion of the condyles can be well perceived by the point of the finger applied before the ears, by which the ſurgeon may, in ſome caſes, collect uſeful information.

In infancy it conſiſts of two oſſifications, which ſoon unite.

The Teeth.

It has been mentioned, that there are ordinarily ſixteen teeth fixed in the ſockets of each jaw: Deviations as to number are very rare.

The chewing or maſticating of the more ſolid parts of our food is the obvious uſe of the teeth, and to this deſtination they are, in every circumſtance, moſt wiſely adapted.

There are always two, ſometimes three, ſets of teeth that appear in ſucceſſion; the firſt called *milk*, the others *adult* teeth.

The ſecond ſet, being the moſt perfect and permanent, may be firſt taken notice of.

Each tooth has common circumſtances.

1. A *body*. That part which is apparent, or without the ſocket.

2. A *root*, or *fang* (radix). This is lodged in the ſocket.

3. A *contraction*, or *neck* (cervix). This is the limit between the body and fang.

4. An *enamel* (cortex), or white cruſt on the body; this is thickeſt on that part which touches the correſponding tooth or teeth when the mouth is ſhut. It gradually becomes thinner towards the neck, where it ends.

5. A *cavity*, or *ſinus*, in the body; this lodges the veſſels and nerves.

6. A *hole*, or *canal*, from the point of the fang to the cavity, tranſmitting the veſſels and nerves.

According to figure, &c. the teeth are divided uſually into three claſſes.

1. *Cutting*, or *inciſive* (inciſores), conſiſting of eight, four in the anterior part of each jaw. Becauſe ſhaped ſomewhat like chiſels, they are well adapted to *cut* or *divide*, their proper office. The upper ones are the largeſt: When well formed and arranged, they are highly ornamental.

2. *Canine* (canini), containing four, two in each jaw, one placed on each ſide of the inciſors. Their name is impoſed from a ſmall reſemblance to the tuſks or tearing teeth of the carnivorous animals, eſpecially the dog. From ſituation, they are called *angular*, and thoſe of the upper jaw *eye-teeth* (occulares)*.

3. *Grinders* (molares), comprehending twenty, or five on each ſide of each jaw. The hindmoſt, on account of late appearance (about the twenty-fourth year), are termed *teeth of wiſdom* (dentes ſapientiæ) †.

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* Mr Hunter chuſes to call them *cuſpidati*. See Natural Hiſtory of the Teeth.

† The eight anterior ſmaller grinders are called, by Mr Hunter, *bicuſpides*, See Natural Hiſtory of the Teeth.

The inciſors have each a ſharp edge, the canine a point, the grinders two or more points or eminences.

The inciſors, the canine, and the anterior or ſmall grinders, are *ſingle-fanged ;* the remaining grinders of the lower jaw have each two fangs, and thoſe of the upper three ; a fact deſerving much attention from the ſurgeon, as it is highly conſequential in the operations of drawing and tranſplanting.

The twenty ſingle-fanged teeth are drawn with the leaſt difficulty, the canine ones, on account of their longer fangs, perhaps, excepted.

Tranſplanting is confined to the ſingle-fanged ones ; the others, for obvious reaſons, rendering it difficult or impracticable.

The ſubſtance of the teeth, the enamel excepted, is of the ordinary oſſeous nature, only peculiarly ſolid and compact. Between it and the ſocket the common perioſteum is interpoſed, and a communication of veſſels takes place. Diſeaſe of this membrane, or the oſſeous part of the ſocket, or both, affects the firmneſs of the teeth, ſo that they often become looſe, and fall out in conſequence.

Inflammation of the communicating and adjacent veſſels and parts gives gum-boil (parulis), and toothach (odontalgia).

The enamel partakes perhaps of the nature of an earthy cryſtallization ; at any rate it is not vaſcular, or capable of growth after it is complete. It is exceedingly compact, for ſuſtaining great and frequent friction with impunity, and for protecting the oſſeous part of the teeth.

It is of great conſequence to preſerve this ſingular ſubſtance from ſuch cauſes as deſtroy it, as the loſs is irreparable, and the interior parts become

come expoſed and decayed, till at laſt the cavity is opened, and the air and other things allowed to hurt the nerves and veſſels, and produce *tooth-ach*. When this happens, the tooth is ſaid to be *carious* or *rotten*.

The enamel is injured or deſtroyed by violence, by all kinds of ſalt, eſpecially acids (becauſe it is of an alkaline nature), and by the remains of the food entangled between the teeth, and become putrid.

Cleaning the teeth properly and carfully, independently of its elegance, is highly important. This ought to be done chiefly by mechanical means, ſuch as waſhing, rubbing with a cloth, bruſh, &c.

The common quackiſh dentifrices and waſhes are for the moſt part deſtructive and pernicious, becauſe they contain ſalt.

The drawing of a tooth conſiſts in deſtroying the veſſels and nerves, by which it is a part of the general ſyſtem. This ought ſurely to be done with as little harm to the ſockets and adjoining parts as poſſible. A proper direction has a great effect; and, of all others, the perpendicular one is obviouſly the beſt: Deviations from it ought to be as ſmall as poſſible.

Tranſplanting of teeth is a very ornamental piece of ſurgery. Its ſucceſs depends on a real concretion taking place between the tranſplanted or ſcion-tooth and the membrane of the ſocket: Hence this membrane ought to be as little violated in clearing the ſocket as may be, and the ſcion-tooth as much of the ſize and ſhape of the diſplaced one as poſſible.

It is neceſſary that the ſcion-tooth be freſh or alive. This is an indiſpenſible circumſtance. A dead or dry tooth is a foreign body, incapable of the wanted connection; on the contrary, it produces ſuppurative inflammation, with much diſtreſs.

The reaſon why a tooth from one ſyſtem may thus be aſſociated with or ingrafted into another, more readily than the more ſoft parts, is its firm texture preſerving the vital arrangement, which theſe, when the circulation of the fluids is interrupted, ſo readily loſe.

Formation and Shedding of the Teeth.

The rudiments of the two ſets of teeth (a third one is very rare), may be early ſeen in the young ſockets, which reſemble little cells in the cancellated part of the jaw bones.

Theſe are vaſcular maſſes or pulps, which increaſing, produce the bodies of the oſſeous part of the teeth, the whole as yet included in a common membrane each.

When the body has acquired its juſt ſize, the enamel is then ſuperadded; perhaps it is a ſecretion from the inveſting membrane, like *teſtacea* or *ſhells*; by this means it gets at once its full ſize.

The oſſeous part continues to acquire length by the growth of the fang, and, in proportion to this length, the body of the tooth approaches to the ſurface of the alveolary proceſs, and emerges through it and the gums. This is called *dentition* or *cutting of the teeth*.

The inciſors of the under jaw generally appear firſt. Theſe are ſoon followed with the others, and the ſmall grinders; and laſt of all the canine ones, perhaps from their lying deeper.

The time of the appearance of the teeth is various; indeed ſome have been viſible at birth: The moſt common period is about the ninth month; ſo that, in the ſucceſſion above ſtated, the whole firſt ſet, conſiſting of ten in each jaw, are apparent by the twenty-firſt month, or end of the ſecond year.

Dentition is frequently productive of great irritation, which brings on ſymptomatic fever, purging, and even convulſion and death. To avert or moderate theſe, *ſcarifying*, or dividing the gum, is a common and not irrational practice. *Exciſion* of the piece of the gum ſtretched, or moſt in the way, is the beſt method.

We muſt not be ſurpriſed if this practice ſhould frequently diſappoint our hopes, becauſe a great ſhare of the irritation may really be much without its reach.

As the fang is extended, the vaſcular pulp and the cavity are diminiſhed to the ſtate we find them in in the perfect tooth.

The milk teeth are ſmall, and ſuited to the comparatively ſmall ſize of the jaw-bones of the infant, and on this account are quite unequal to the neceſſary taſks of after life. This is the final cauſe of their being ſhed or thrown off, which happens to no other bones.

Theſe twenty teeth occupy the alveolary borders as fully as thirty-two larger ones do afterwards, becauſe as yet the jaw is not expanded; it is a ſmall arch, which is gradually extended, eſpecially at its ſides and extremities.

On this account the faces of infants are flat and round, and what may be called, in the ſtile of painters, angelic: By degrees the rotundity is diminiſhed, and the face gets its due projection; in conſequence of which the forehead ſeems to recede or be leſſened; a deception ariſing from not attending to the ſmall proportion of the face, compared to the ſize of the ſkull during infancy.

As the jaw bones are expanded, the teeth become more diſtant from one another, and finally are looſened by the loſs of their ſockets; chiefly owing to the preſſure and progreſs of the ſecond ſet, which are concealed in their diſtinct and proper ſockets: ſo that the teeth are ſhed or fall out nearly in the order of time in which they appeared.

The ſhedding begins about the ſeventh year, and is completed before the twelfth; the additional molares then appear in ſucceſſion.

The adult teeth loſe their firmneſs, and finally their ſituation in the aged ſyſtem.

This ſeems to be the effect of the ſtate of the jaw bones, and of the teeth and their veſſels, which is no doubt a primary ordination, and an indication of advancing decay and death.

The Bones of the Ear.

Theſe are four,

1. Anvil, or *incus*.
2. Hammer, or *malleus*.
3. Orbicular bone, or *os orbiculare*.
4. Stirrup, or *ſtapes*.

The incus reſembles a ſmall grinder with two fangs; upon the body there is an articular ſurface, which forms a joint with the malleus.

The malleus has a round head or ball, and on it a correſponding ſurface to that of the incus; its ſmall and pointed end is its handle; it carries two proceſſes, one is long, and called *proceſſus Riolani*.

The os orbiculare is a granule, and interpoſed between the former two.

The ſtapes really reſembles ſtrongly our ſtirrupiron. It is the loweſt in regard to ſituation, and lies on its ſide in a cavity of the drum, called *feneſtra ovalis.*

The chief uſe of theſe bones is to move on one another by muſcles, and regulate the tenſion of the membrane of the drum, according to the degree of the undulations or pulſes of the air, and thus favour diſtinct hearing.

Inflammation of the tympanum and adjacent cavities can ſcarcely fail to diminiſh or deſtroy hearing, and is even likely to be dangerous, if it ſhould ſuppurate and produce caries of the os petroſum. On this account this inflammation (otitis) ought to be carefully checked by antiphlogiſtics, and, when matter is produced, waſhed off by mild injections.

Os Hyoides.

This bone, which very much belongs to the tongue, has been called *tongue-bone.* Its curvature, from which it is named, reſembles that of the baſe of the lower jaw, and maintains a ſituation not a little paralel.

Its body is broad and foremoſt, and can be felt without diſſection. To each end is fixed an epiphyſis; they are called *horns* (cornua). Their poſterior ends are knobs, which are connected with the ſtyloid proceſſes of the temporal bones.

Where the cornua are joined to the body, and on the upper part, are two ſmall epiphyſes like barley-corns (cornua minora, appendices) which, by means of ligaments, have a connection with the angles of the lower jaw bone.

Of the Trunk.

In the trunk are two great cavities called *venters;* the uppermoſt is the *cheſt* (thorax); the other is the *belly* (abdomen); the bottom of the laſt is called *pelvis*, from its reſemblance to a *baſon*.

The ſkeleton of the trunk exhibits,

1. The *ſpine*, (ſpina, carina) which is a chain of bones called *vertebræ*, (from their permitting the body to make the neceſſary turns and flexures,) extending from the occipital bone to the under and poſterior part of the pelvis.

2. The *ribs*, (coſtæ, cuſtódes,) which are twentty-four arches, with little deviation as to number, laterally incloſing the thorax. They are diſpoſed in pairs, and conſequently twelve on each ſide.

3. The *breaſt bone*, (ſternum) placed obliquely in the fore part of the cheſt, oppoſite to the ſpine: To it the ribs are fixed by cartilages.

4. Two *nameleſs* but large bones, (oſſa innominata) which complete the pelvis on the ſides and fore part.

The Spine.

The *neck* or *cervical* part of the ſpine inclines forwards; the *back* or *dorſal* part bulges backwards, and thus enlarges the cheſt; the *loin* or *lumbar* portion arches a little forwards, and reſtores the perpendicular bearing of the head; and finally, the *baſon*-part or *termination*, which is conſiderably hollow before, ſtands much backwards and enlarges the pelvis.

The ſpine repreſents two pyramids, whoſe baſes are joined together at the under part of the loins, and conſequently the point of the uppermoſt is connected with the head, while that of the other is the inferior extremity of the ſpine.

The upper pyramid, by much the longeſt, conſiſts of twenty-four vertebræ; in the freſh ſubject they are joined together by a ſubſtance, either cartilage or very like it, and therefore eaſily ſeparable; on this account called *true* vertebræ: While thoſe forming the under pyramid are blended by oſſification, ſo as only to be diviſible into two pieces, the *os ſacrum* and *os coccygis*, therefore termed *falſe* vertebræ, and often reckoned along with the bones of the pelvis.

A vertebra conſiſts of a body and proceſſes.

The body, which is foremoſt, is rounded on the fore part and ſides, and is ſtrictly a part of the ſhaft of the ſpinal column. Its margins project a little like ſuperadded rings. The upper and under ſurfaces are flate; to theſe the cartilages are joined.

The laminated part is exceedingly thin and porous, while the cancellated ſubſtance is very cellular and abundant, by which the ſize and not the weight is increaſed.

The ſeven proceſſes ſtand backwards, and are connected to the body by an arch, which neceſſarily forms a hole, large, round, and perpendicular, immediately behind the body. This hole is a part of a common canal, juſtly termed *ſpinal*, nearly co-extended with the ſpine.

The ſpinal canal lodges that important part of the nervous ſyſtem, called *ſpinal marrow*, and may therefore not improperly be regarded as an *elongation* of the ſkull.

The proceſs ariſing from the poſterior part of the arch is adzygous, and named *ſpinous*, perhaps becauſe the whole ſeries which form an interrupted line, has been likened to the prickles of a thorn.

The ſpinous proceſs are commonly viſible, and may always be felt without diſſection, a fact to be well remembered by the Surgeon, when making enquiry regarding *diſtortion*, *fracture*, *tumour*, &c.*

Two proceſſes, one on each ſide of the arch, are more or leſs at right angles with the ſpinous one, and therefore named *tranſverſe*.

Four proceſſes, termed *oblique*, or *articular*, from poſition or office, ariſe from the edges of the arch; two above facing more or leſs backwards, and two below, turned proportionally forwards.

The articular proceſſes of any two contiguous vertebræ, covered with cartilage, are connected by a capſular, or incloſing ligament, ſo as to glide a little on one another. Without this artifice the equable and diffuſed flexion of the ſpine could not take place.

There is a poſſibility of diſlocation among the oblique proceſſes, which does not ſeem to exiſt as to the bodies of the vertebræ in general: Becauſe theſe laſt are cloſely in every point of their flat and touching ſurfaces, bound together by the intervertebral matter or cartilage, which reſiſts more than the bone; ſo that violence produces fracture rather than luxation of the bodies.

Between the oblique proceſſes and the body of each vertebra, are four notches, one in each edge of each ſide of the arch, which are completed into as many *common holes*, to tranſmit the twenty-four uppermoſt pairs of ſpinal nerves, alſo veſſels; a circumſtance illuſtrative of the analogy between the ſkull and ſpinal canal, as above ſtated.

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* See Syſtematic Elements of Surgery.

The texture of the proceſſes is more firm and compact than that of the body. This contributes greatly to protect the ſpinal marrow.

The *firſt* claſs of the vertebræ, or *ſeven* uppermoſt, becauſe ſituated in the neck (cervix) are called *cervical*, and have ſeveral peculiarities; being the upper part of the pyramid, they are ſmaller than the reſt; and, for the ſame reaſon, their ſize gradually encreaſes downwards: The ſpinous proceſſes are terminated by two little knobs or points each, to favour the connection of the muſcles: And, laſtly, the tranſverſe proceſſes have holes (one in each near its root) ſo diſpoſed, that two interrupted canals (one on each ſide) are produced, which tranſmit two large arteries to the brain, from this circumſtance, named *vertebral;* they enter the ſkull through the occipital hole in a bended or winding courſe, in this reſembling the carotid ones: A circumſtance aptly calculated to diminiſh the rapidity of the blood before it reach the brain.

The obvious intention of theſe vertebral canals is to inſure a ſupply of blood to the brain, although the carotids ſhould be obſtructed; and hence it happens, that, during ſtrangulation, as there are no vertebral or protected veins to return the blood, there is an over quantity in the head, or a degree of apoplexy.

The uppermoſt, or firſt cervical vertebra, which immediately ſupports the head, called *atlas*, in alluſion to the fable of a mountain ſo named, ſuppoſed to bear up the heavens, has but a ſmall ſhare of the common make.

It reſembles an irregular ring, and is wider than any of the others of this claſs. Inſtead of a body, it has a conſiderable notch, that augments its hole, from which, however, in the entire body, dy, the notch is cut off by a ſtrong tranſverſe ligament.

In this notch, thus formed into a hole, a proceſs of the ſecond vertebra is received, and allowed to approach the cuneiform proceſs of the occipital bone, to which it adheres by means of a ſtrong ligament.

About this proceſs, the firſt vertebra has a free motion, which gives that of the head.

There is only the veſtige of a ſpinous proceſs, and, in place of oblique proceſſes, are *hollows;* the two upper ones receive the condyles of the occipital bone; and the under, the oblique proceſſes of the ſecond vertebra.

The ſecond vertebra, which approaches to the common ſtructure, is called *dentata* and *odontoides*, on account of the upper part of its body being lengthened into a proceſs like a tooth, already deſcribed, and connected with the occipital bone.

The diſlocated, or broken neck, is moſt likely to take place between theſe two vertebræ, on account of the abſence of the intervertebral cartilage.

When a perſon falls on the neck, and is ſtunned or motionleſs, theſe vertebræ may be ſuppoſed to be diſturbed; an idea that juſtifies gentle extenſion, with a view to adjuſt them, and relieve the ſpinal marrow from compreſſion it may be ſuffering.

In extenſive motions of the head, when the chin is carried near to the ſhoulder, beſides the motion between theſe vertebræ, the reſt of the cervical column is ſlightly twiſted.

It does not appear that the necks of hanged people are diſlocated or broken, at leaſt when no greater weight than that of their bodies is allowed to act on them.

The laſt vertebra of the neck aſſumes very much the figure of thoſe of the next claſs, particularly in the prominence of its ſpinous proceſs: For this reaſon, it is named *vertebra prominens*.

The *ſecond* claſs comprehends the *twelve* vertebræ that ſucceed to thoſe of the neck; on account of their ſituation being oppoſite to the breaſt-bone, and corresponding to what is commonly called the *back* (dorſum), they are termed *dorſal*.

The bodies of theſe vertebræ project a great deal forwards, and make up the middle of the upper pyramid.

The ſpinous proceſſes are long, pointed, and ſlant much downwards; a circumſtance that limits motion.

The tranſverſe proceſſes incline a good deal backwards, and are articular on the fore part of their extremities, to be joined to the knobs of the ribs, the two laſt excepted.

On the lateral and back part of the body of each, on both ſides, is a *ſemidigital impreſſion*, or ſmall notch, that, with a contiguous one of the adjoining vertebra, forms a cavity for the head of the rib, whoſe knob is fixed to the tranſverſe proceſs of the undermoſt of the two. The firſt and two laſt uſually have on each ſide an entire cavity of this kind; by which diſpoſition, the head of the firſt rib is only received by the cavity of the firſt vertebra, and its knob tied to its tranſverſe proceſs; while that of the next (to the tenth incluſive), is fixed in the cavity produced by the two vertebræ, to the proceſs of the undermoſt of which its knob is tied.

The *third* claſs, called *lumbar*, becauſe the ſituation correſponds to the loins (lumbi), conſiſts of *five;* the laſt is the largeſt, and is the baſe of the pyramid of the true vertebræ.

The ſpinous proceſſes, comparatively ſhort and horizontal, are terminated by ſlight knobs; by this conſtruction a conſiderable backward flexion is allowed.

The diſeaſe, called *ſpina bifida*, a round tumour, generally projects between two of theſe proceſſes, which, perhaps, in ſuch caſes, are malformed, and may thus contribute to the production of it.

The tranſverſe proceſſes are ſhort, and have not the ſlanting and articular ſurfaces poſſeſſed by thoſe of the dorſal claſs. The firſt of thoſe circumſtances favours motion in a lateral direction.

Os Sacrum.

This bone, which makes the baſe and body of the under pyramid, viewed from before or behind, is triangular; the moſt acute angle is loweſt, and articulates with the os coccygis.

The uppermoſt ſide is the baſe of the pyramid, and is joined by the intervertebral matter to that of the other or inferior ſurface of the laſt lumbar vertebra.

The other ſides are connected with the poſterior extremities of the oſſa innominata, by the interpoſition of a ſubſtance, the ſame with, or much reſembling that which binds the vertebræ together; for this purpoſe they are partly articular.

The anterior ſurface is extenſive, and conſequently incloſes a good ſhare of the pelvis; it is hollowed, and named *concavity*.

The poſterior ſurface is rough and convex; a ſeries of proceſſes divides it longitudinally; they are called *ſpinous*, becauſe ſimilar to and coinciding with thoſe of the upper pyramid ſo named.

Five tranſverſe lines on the fore ſide point out the limits of the ſix pieces of which this bone conſiſted, but become one by oſſification; they are named *falſe vertebræ*, as well as on account of ſimilarity in other reſpects.

A large *triangular canal*, an evident continuation of the ſpinal one, runs from the upper ſide nearly to the loweſt angle: It is gradually narrowed as it proceeds downwards, and ends by a longitudinal *ſlit* or *fiſſure*.

Five pairs of *holes*, large and round, with lateral grooves, ſlanting outwards on the foreſide, tranſmit the *ſacral* nerves from the canal, and point out the analogy to the common holes between the true vertebræ already deſcribed.

The like number of ſmaller holes are on its backſide, which likewiſe give paſſage to ſmall nerves.

Os Coccygis.

This, in figure, ſomewhat reſembles the os ſacrum; it completes the pyramid of the falſe vertebræ, being in early life evidently made up of ſeveral pieces. A continuation of this in brutes gives the oſſeous part of their tails; it has been named *os caudæ* on this account.

The *baſe* is joined to the loweſt angle of the os ſacrum, by cartilaginous ſubſtance, ſo as to have flexion.

The direction is forwards and downwards, by which the concavity of the os ſacrum is augmented.

This bone has no canal nor holes; the laſt pair of ſpinal nerves paſs between it and the os ſacrum.

The *mechaniſm* of the ſpine, entirely conſidered, appears to be artful in the higheſt degree. Regarded as a pillar, it poſſeſſes the ſeemingly incompatible qualities of ſtrength and flexibility. The former in the erect poſture, ſuſtaining the weight of the ſuperior parts, eſpecially the head, and this often increaſed by great burdens; the latter favouring the neceſſary motions of the trunk.

The importance and delicacy of the ſpinal marrow required that the flexion ſhould be limited, while diffuſed over the whole, ſo that no point might be unduely bent and compreſſed; becauſe diſeaſe immediately follows.

It is not ſurpriſing that the due arrangement of the ſpine ſhould often be altered, or that *ſpinal diſtortion* (gibboſitas) ſhould enſue. PALFIN, CHESELDEN, &c. have recorded very remarkable inſtances of it.

The height of the whole body is diminiſhed in proportion to this diſtortion. Hence the dwarfiſh degraded figures ſo frequent.

This affection proceeds from

1. Mal-poſture,
2. Rickets.

The obvious plan of cure is not only to make a preſſure, as is commonly done, on the faulty point, but alſo to relieve it from the incumbent weight, by proper inſtruments, well adapted, and perſeveringly employed, while poſture, diet, &c. are duly conſulted *.

The ſpinal canal, like the ſkull, may be opened from behind, by the trepan of due conſtruction, when the ſpinal marrow is under compreſſion,

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* See Syſtematic Elements of Surgery.

ſion from fluid, fracture of the arches, and proceſſes, &c. *

The Ribs.

The curve of a rib is quite peculiar.

The hind or vertebral extremity of each has a roundneſs, called *head*, ſuited to the figure of the cavities in the ſides of the bodies of the vertebræ, as deſcribed.

The connection of the head and cavity is capſular, admitting of an obſcure motion. A diſlocation, which is rare, is confined to a forward direction.

Next to the head is a contraction called *neck*, limited by a *knob* or *tuberoſity* on the convexity, which is joined to the correſponding tranſverſe proceſs by a capſular ligament, ſo as to be capable of a ſmall gliding.

Not far from the tuberoſity is the *angle*, a bending, confined almoſt to the external ſurface, and produced by the muſcles.

The middle portion is flattened, and has one broad ſurface outwards, and one inwards, in general. Its upper edge is a little thick, and rounded; the under one has a ſmall *groove* between two ſpines, at leaſt towards the back. In this the intercoſtal veſſels and nerves are lodged.

The fore end, which may be called *ſternal*, has a *digital impreſſion*, to hold the end of a cartilage, by which it is fixed to the ſide of the breaſt bone. The two laſt are not thus connected, and therefore termed *floating*.

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* I have tried the experiment ſucceſsfully on the ſkeleton.

The ſeven uppermoſt ribs on each ſide, being directly joined by their cartilages to the ſternum, have been called *true* (cuſtodes veræ), while the remaining five are termed *falſe* and *ſhort*, becauſe their cartilages do not reach that bone, but are tied to the others.

The upper or firſt rib has its broad ſurfaces turned upwards and downwards nearly, and its edges conſequently outwards and inwards.

The upper edge has a *wide ſhallow groove*, inclining forewards, made by the artery named *ſubclavian*, going to the arm, which may occaſionally be compreſſed againſt the rib, ſo as to ſtop the blood. This fact may be uſefully applied in chirurgical operations near the ſhoulder.

The ſecond rib is longer than the firſt, and has more of the common figure.

The length of the ribs increaſes to the ſeventh on each ſide incluſive, and the downward inclination is augmented to the laſt, ſo that the two undermoſt may be ſaid to *hang*, as well as *float*; by which the length of the cheſt is increaſed towards the ſides.

The angles of the ribs form two diverging lines, juſtly compared by Winslow to the limbs of a pair of compaſſes, moderately opened. Theſe of the firſt ribs coincide nearly with the tuberoſities, while thoſe of the undermoſt are conſiderably more forward.

The convexity of the ribs, and conſequently their direction, can be felt, without diſſection, when the body is not corpulent. The knowing ſurgeon avails himſelf of this in diſcovering fracture, and in performing the perforation of the cheſt (paracenteſis thoracis).

The convexity of the thorax, ariſing from the diſpoſition of the ribs, joined to an elaſticity, derived from the articulations and cartilages eſpecially, contribute much to elude the effects of ſtrokes, falls, &c.

The Sternum.

This reſembles ſomewhat a ſhort dagger, with its handle uppermoſt; its point, which is the loweſt part of the cheſt before, has, on this account, been called *enſiform* (cartilago xiphoides).

It lies very ſlantingly; while the upper end is about two inches from the ſpine, the under one is three times as diſtant. This gives the conical figure of the thoracic cavity, which is conſiderably interrupted behind by the prominence of the ſpine.

The ſternum is flat, about an inch broad, and the edges turned laterally to correſpond to the cartilages of the ribs, of which they bear the impreſſions. The broad ſurfaces are turned forwards and backwards.

This bone is conſiderably curved. The convexity is forward, and thus an arch is conſequently preſented to any occurring violence, while the capacity of the cheſt is increaſed, to give due ſpace to the heart, which lies immediately behind.

Its ſubſtance is ſpongy, about a quarter of an inch thick, and tolerably equable. It therefore may be bored by the trepan for various indications.

In old age it is one piece, although in early life it conſiſted of ſeveral; in the adult often of three, but ofteneſt of two.

The uppermoſt of the three is the broadeſt, and ſomewhat triangular. It is notched at the upper edge, and the internal face is ſomewhat hollow, to allow the paſſage of various organs, and to enlarge the upper part of the cheſt.

To the upper angles, which are formed into notches, are reſpectively fixed the extremities of two bones, named *clavicles*, belonging to the ſuperior extremities; to the under angle is attached, by cartilage, the upper end of the middle portion.

On each edge is a cavity for the cartilages of the firſt ribs, and half of one for thoſe of the ſecond.

The middle piece has in its edges impreſſions for half of the cartilages of the ſecond and ſeventh ribs, and for all thoſe of the intervening ones.

The inferior or enſiform portion is ſhorteſt, and ſometimes bifurcated. It is variouſly projecting, and its root has part of the impreſſions of the ſeventh ribs *.

It is evident, that, when the ſternum, eſpecially its under end, is removed from the ſpine, the cheſt muſt be enlarged in the forward direction. This is the effect of raiſing the ribs, eſpecially their fore ends, which alſo, by forcing their convexities a little outwards, at the ſame time dilates the cavity on every ſide; a change which is produced by the proper muſcles, and takes place during every deep *inſpiration*. When the muſcles ceaſe to act, the ſternum and ribs, now much on the ſtrain, chiefly in conſequence of elaſticity derived from the cartilages and ligaments, reſume their former ſtate. This gives, in a great meaſure, *expiration*. The alternation or regular ſucceſſion of theſe actions affects the lungs, which are in the cheſt, and conſtitutes that important function, *reſpiration* or *breathing*.

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* When we wiſh to reach the pericardium with a perforation, the trepan is applied to the middle piece, near its low end.

In a child I examined lately, the ſternum is wanting, ſo that the action of the incloſed parts can be ſeen.

Oſſa Innominata.

Each of theſe, during early life, plainly conſiſts of three pieces, which, before puberty, become one:

1. Os ileum, or *haunch-bone.*
2. Os pubis, or *hip-bone.*
3. Os iſchii, or *ſhare-bone.*

Os ileum is the uppermoſt and largeſt part of the os innominatum; its circular edge, which forms the ſweep of the haunch, is called *creſt* and *ſpine*: This can be traced without diſſection.

The fore end of the ſpine, and a protuberance about an inch and half below it, are the *ſuperior* and *inferior ſpinous proceſſes*.

The interior ſurface is ſomewhat hollowed; and is named *foſſa iliaca*: It contains the body of the *iliacus internus* muſcle.

Bounding the foſſa iliaca, on the under part, is a prominent ridge, ſtretched from the upper point of the os ſacrum to the os pubis, termed *linea innominata*, which makes part of the *brim* of the pelvis.

On the hind and internal part is an *articular ſurface* connected to the edge of the os ſacrum. It has ſomewhat the form of the human external ear. The joint is ſecured by cartilaginous matter like the intervertebral.

The outer ſurface is hollowed by the preſſure of ſtrong muſcles belonging to the leg; and is terminated before by part of an articular cavity for the reception of the thigh-bone, named *acetabulum* from figure, and *cotyloid* from depth.

The under and poſterior edge carries a ſemicircular notch, which becomes a hole, by the aſſiſtance of a ligament, named *ſacro-iſchiatic*, and tranſmits the poſterior nerves and veſſels of the leg and adjacent parts.

Os iſchii is the loweſt portion of the os innominatum.

The inferior parts, ſtrongly marked by the attachment of muſcles, and on which the body is ſupported when ſitting, is called *tuberoſity* (tuber iſchii).

On the back part, above the tuberoſity, is a ſharp proceſs, inclining to the edge of the os ſacrum, termed *ſpine* (ſpina iſchii).

Between the ſpine and tuberoſity the ſurface is ſomewhat hollowed and poliſhed, like a pully. The tendon of the *obturator internus* muſcle paſſing from within, plays on it.

A proceſs, named *ramus*, ſtands obliquely forwards from the tuberoſity, about an inch and half in length, and unites with a ſimilar one from the os pubis; and thus make about half of the circumference of a large oval-like hole, called, from its figure, *thyroid* (foramen thyroideum vel ovalare) which is nearly filled up by a ligament, named *obturator;* and, by two muſcles *obturator internus*, and *externus*.

The upper part of this bone forms a ſmall ſhare of the acetabulum behind.

Os pubis is the foremoſt part of the os innominatum.

The anterior extremity is joined by cartilage to its fellow; the junction is called *Symphyſis pubis.*

The ſuperior and external edge is turned a little outwards like a lip, and is named *creſt;* the low end of the *rectus abdominis* muſcle is fixed to it.

The poſterior extremity is connected with the os ilium, and contributes a ſhare of the acetabulum.

The *ramus*, a ſlender and ſhort proceſs, is directed downwards and backwards to one of the ſame name from the os iſchii, as has been mentioned.

The root of this proceſs touches its fellow at the under part of the ſymphyſis pubis; the proceſſes then receding mutually and ſuddenly form a curvature, which is called the *angle*, but more properly the *arch of the pubis*, which is conſiderably larger in the female than male, for an obvious reaſon.

In both ſexes the *urethra* lies in the *top* or *middle point* of the arch, iſſuing from the neck of the bladder that reſts upon the ſmooth internal ſurface on each ſide of the ſymphyſis. The Lithotomiſt and Accoucheur ought to be well acquainted with this diſpoſition.

It has been already noticed, that the incloſure completed by the oſſa innominata, is called *pelvis.*

The upper aperture of the pelvis is its *brim*, and the lower one its *bottom.*

The connection of the os ſacrum and laſt lumbar vertebra is ſuch that the fore part of the brim of the pelvis is much inclined downwards, and the cavity itſelf gets a backward direction; a circumſtance which has many excellent effects, particularly, it frees the included parts, in a great meaſure, from the preſſure of the abdominal organs, and permits extenſive flexion of the upper part of the trunk forwards, without the riſk of bruiſing: To this laſt effect the ſloping diſpoſition of the ends of the ribs, from the ſternum on each ſide, contributes not a little.

The female pelvis, in conſequence of an original ordination, is wider but more ſhallow than the male one, and the incloſing bones more ſlender.

The operative part of midwifery is almoſt entirely founded on an accurate knowledge of the pelvis *.

It has been mentioned that the acetabulum is formed by the union of the three pieces or oſſifications of the os innominatum.

The upper part of its brim is higheſt. It is much leſs projecting before, and, oppoſite to the thyroid hole, it is interrupted. A ligament is ſtretched acroſs the gape, through which veſſels, &c. are tranſmitted.

Nearly in its bottom is a *rough hollow*, to which the end of a ſtrong ligament from the thigh bone, named *round* and *internal*, is fixed.

On account of the greater width of the pelvis, the acetabula, and conſequently upper parts of the thigh bones, are more remote from one another in the female than male. A circumſtance which has ſome influence on walking, running, &c.

Upper

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* See Principles of Midwifery, or Puerperal Medicine.

Upper Extremity.

This conſiſts of

1. Shoulder,
2. Arm,
3. Fore-arm,
4. Hand.

The ſhoulder has two bones,

1. Scapula, or *ſhoulder-blade.*
2. Clavicula, or *collar-bone.*

The arm has one,

Os humeri, or *arm-bone.*

The fore arm has two,

1. Ulna,
2. Radius.

The bones of the hand are,

Eight carpal in the wriſt (carpus).
Five metacarpal, in the middle (metacarpus).
Fourteen digital, in the fingers.

The Scapula.

This is a buckler-like bone, placed upon the upper poſterior and ſomewhat lateral part of the cheſt.

The ſurface, turned to the ribs, is irregularly concave, and contains the *ſubſcapularis* muſcle.

The outer ſurface is ſlighty convex, and is unequally divided into two by a ſtrong *ſpine*, gradually becoming more prominent as it advances forward, and ends in a flattened projection, named *acromion* proceſs, which can be well diſtinguiſhed without diſſection; a circumſtance important to the Surgeon in judging of the condition of the ſhoulder joint, as this bounds and forms the upper part of it; for which purpoſe, it has an articular ſurface turned forwards, and joined to the end of the clavicle.

The ſpace above the ſpine contains the *ſupra-ſpinatus* muſcle; and that below it the *infra-ſpinatus* one.

The edge, turned to the ſpine, is called *baſe*, the figure of the whole being ſomewhat triangular; it is a little rounded, eſpecially above the beginning of the ſpine: To this internally the poſterior part of the *ſerratus magnus* muſcle is fixed.

The uppermoſt edge, called *ſuperior coſta*, is ſhort and notched, for the tranſmiſſion of veſſels, &c.

The third edge (*inferior coſta*) is thicker than the others, and, in certain attitudes of the arm, is turned forwards.

What may be called the *anterior angle* has an *oval glenoid cavity*, for the reception of the os humeri, beyond the margin of which the ſlight and ſhort contraction is *neck*, or *cervix*. The capſular ligament is attached to the margin.

From the upper extremity of the glenoid cavity, a ſtrong finger-like proceſs ſtands forwards, and a little downwards, named *corocoid*, becauſe compared to the beak of a bird.

This proceſs, beſides giving attachment to muſcles, contributes greatly to ſecure the joint on the fore part, by virtually deepening the glenoid cavity. It can be felt in the entire ſubject.

It thus appears, that the ſcapula is only connected with the bones of the trunk by means of the clavicle.

The

The Clavicle.

This is placed almoſt horizontally between the notched angle of the upper piece of the ſternum and the acromion proceſs; and is a prop obviouſly intended to prevent the ſcapula from falling unduly forwards.

The anterior end is articulated with the ſternum, with the interpoſition of a moveable cartilage, like thoſe of the under jaw.

A ſtrong ligament connects the clavicles to one another, attached to proceſſes inclining inwards, near the capſular ligaments, and is called *interclavicular.*

The middle portion arches forwards, and croſſes obliquely the firſt and ſecond ribs, near their poſterior ends, ſo that the brachial veſſels paſs between it and them.

The poſterior end is flattened, ſomewhat like the acromion, to which its tip is articulated, ſo as to poſſeſs an obſcure motion.

The ſcapula and clavicle are obviouſly a moveable fulcrum to the ſuperior extremity. It is quite peculiar, and, by permitting the glenoid cavity to change place in every direction, greatly extends and diverſifies the motions of the arm, ſo indiſpenſably uſeful.

The clavicle is neceſſarily ſubjected, in many caſes, to very great ſtrain, and is accordingly often fractured; an accident eaſily diſcovered, becauſe the bone can not only be traced by the finger, but the eye, without diſſection.

It is difficult, on account of the tranſverſe ſituation of the bone, to preſerve properly the ſituation of the fragments after *ſetting*. Keeping the ſcapula ſecurely retracted, by a proper bandage, is the beſt method.

The ſcapular end of the clavicle, when diſlocated, is diſcovered by accurate preſſure with the finger. It ſtarts upwards. After being fully returned, a fit bandage, and freedom from motion for a conſiderable time, are neceſſary to a good cure.

Os Humeri.

The *head* or upper end is bulbous, and ſupports an articular hemiſphere, or *ball*, placed obliquely inwards and backwards. This is received into the glenoid cavity, and completes the ſhoulder joint.

The margin of the hemiſphere ſuſtains the under edge of the capſular ligament, which is long, to favour the ample motion of this joint in all directions.

A diſlocation of this bone can hardly take place in an upward direction, without fracture of the acromion. It moſt frequently, or rather always, happens in a forward and downward one, ſo that the head is felt in the arm-pit, or at its fore part, while a vacancy is perceived under the acromion, and the rotundity of the ſhoulder ſurface much diminiſhed. The Surgeon, attentive to theſe circumſtances, will ſeldom fall into miſtake as to the exiſtence of luxation.

On the anterior part of the head, without the capſular line, and immediately below a contraction called *neck*, or cervix, are two *tuberoſities*, ſeparated from one another by a deep *groove*, continued conſiderably downwards, which is gradually diminiſhed. It may be called *bicipital*, becauſe it lodges one of the tendons of the *biceps* muſcle of the arm, on its way to paſs within the capſular ligament, to be fixed to the brim of the glenoid cavity.

Theſe tuberoſities, of which the outermoſt is greateſt, give convenient attachment to the adjacent muſcles of the ſhoulder.

The body is ſomewhat round on the exterior part; about the middle is a ſcabrous ſurface, to which the low end of the *deltoid* muſcle adheres.

The under end is ſomewhat flattened on the fore and back part, and its edges, which are turned obliquely outwards and inwards, project conſiderably, under the improper name of *condyles*, becauſe they are not concerned in an articulation. The internal one is longeſt. The upper ends of many muſcles of the fore arm and hand are fixed to them, and have their power increaſed by the projection of theſe proceſſes.

The condyles can be exceedingly well felt, and ought to guide the Surgeon in ſetting fractures of this bone.

The tip of this end of the bone is articular, and ſuited to the ends of the fore-arm bones. It is diſtinguiſhable into two portions. The innermoſt, like the edge of a *pully*, is called *trochlea*. It anſwers to the end of the ulna, and is bounded above, both before and behind, by two *pits*, or *foſſæ*, which receive occaſionally two proceſſes of the laſt named bone. The outermoſt, ſomewhat prominent in the middle, ſupports the end of the radius, and allows it to turn at ſame time about its axis.

When the bone is held perpendicularly, the internal part of the inferior end is conſiderably lower than the external. This obliquity, during the flexion of the elbow joint, inclines the hand ſpontaneouſly to the face or breaſt.

The Ulna.

This has derived its name from its being employed as a meaſure. It is placed on the internal ſide of the fore-arm, and is as it were its baſe.

The upper end exhibits a large notch, turned upwards and forwards. It is articular, and plays on the pully of the os humeri already deſcribed. It is called, from ſize and figure, *great ſigmoid cavity*, to diſtinguiſh it from a *ſmaller one* ſo named immediately adjacent on the external ſide, which receives the edge of the head of the radius, and allows it to turn about its axis.

The great ſigmoid cavity is bounded behind by a ſtrong ſcabrous proceſs, which is readily felt without diſſection, and is the *tip of the elbow.* It is named *olecranon.* When the arm is extended, it occupies the poſterior pit on the hind part of the end of the os humeri mentioned above, and is the point on which one occaſionally ſupports the arm.

The anterior boundary of this cavity is prominent and pointed, and called *coronoid* proceſs. It can be diſtinguiſhed through the ſoft parts, when the finger is properly directed againſt it. To a ſmall hollow, a little below this, the under end of the *brachialis internus* muſcle is fixed.

The body is ſomewhat triangular, and gradually becomes ſmaller. The angle turned to the radius is the moſt acute, and ſupports the edge of a *ligament*, placed between them, and therefore called *interoſſeous.*

The inferior end is a roundiſh knob, with a projection behind, named *ſtyloid proceſs*. Grooves made by tendons appear near this proceſs: It can be diſtinctly felt in the entire arm, and may be a guide to the Surgeon in regard to the management of fracture.

The Radius.

This occupies the edge of the fore-arm that anſwers to the thumb, and a great deal reſembles the ulna reverſely placed.

The upper extremity is a knob carrying a ſlight hollow, by which it is at once accommodated to the articular ſurface of the os humeri, and the ſmall ſigmoid cavity of the ulna.

One capſular ligament binds this and the correſponding end of the ulna to the os humeri, in ſuch ſort, that the radius is allowed its turning and bending motions, while the ulna enjoys the latter only.

The depth of the ſigmoid cavity, and the ſtrength of the ligaments, are a great ſecurity againſt diſlocation. When, however, this happens backwards, the coronoid proceſs is forced beyond the pully of the os humeri, which gives, at ſame time, an unſual projection of the elbow, and a proportional ſhortening of the fore-arm. Without great laceration of the ligaments, the olecranon is likely to be fractured before a luxation, in a forward direction, can be produced.

The *neck* (cervix) of the radius is a conſiderable contraction immediately below the mark of the capſular ligament, bounded, on the fore part, by a tuberoſity, turned a little towards the ulna, to which the under end of the *biceps* muſcle adheres. This can be perceived by the ſingers through the covering ſoft parts.

The body, like that of the ulna, has a correſpondent *ſpine* for the edge of the interoſſeous ligament.

The inferior end is expanded, and, below, has an *articular cavity* placed tranſverſely, which is ſomewhat extended by the ulna.

To the articular cavity of the radius the carpus is ſolely joined, ſo that it muſt always follow the motion of this bone, which has therefore been called *manubrium manus*, or *handle of the hand.*

A ſmall cavity, reſembling the leſſer ſigmoid one, already deſcribed, receives the adjacent point of the ulna, and favours the turning motion.

This motion of the radius about itſelf, when it places the palm of the hand forwards or uppermoſt, is called *ſupination*, and is produced by the *ſupinator* muſcles; when it turns it the oppoſite way, it is termed *pronation*, and is the effect of the *pronator* muſcles.

The back or outer ſurface of the low end of this bone has grooves for tendons of various depth, according to age, &c.

The Carpal Bones.

Theſe ſmall bones, the baſis of the wriſt, are ranged in two tranſverſe rows.

Thoſe of the firſt row, reckoning from the thumb, are,

1. Os Scaphoides,
2. — Lunare,
3. — Cuneiforme,
4. — Piſiforme:

And of the ſecond,

5. Os Trapezium,
6. — Trapezoides,
7. — Magnum,
8. — Unciforme.

This collection is arched ſlightly towards the back of the hand, and proportionally hollow on the ſide of the palm, by which it is ſtrengthened, and fitted to lodge and protect the tranſmitted parts.

The three firſt of the upper row form, conjunctly, a kind of oval articular head, that is received into the adjoining cavity of the radius, and thus make the wriſt-joint, which, in conſequence, has motion in all directions.

Theſe eight bones are joined to one another, and to the metacarpal ones by capſular ligaments, which permit a gliding or obſcure motion, ſufficient, however, to render the arch uſefully elaſtic, and advantageouſly to ſupport the remaining part of the hand.

The carpal bones are moſt frequently diſlocated in a backward direction, ſo that they mount upon the back part of the ends of the fore-arm bones, and cauſe a proportional tumour of the inner ſurface; in violent caſes, the ends of the laſt named bones lacerate the ſoft parts, and form what may be called a *compound luxation.*

The laminated parts are very ſcanty, ſo that caries is readily extended from the one to the other, and difficultly cured.

The Metacarpal Bones.

Theſe are five, correſponding to the thumb and fingers.

The upper ends are fixed by capſular ſurfaces to the carpal bones; the bodies are gently arched ſo as to give a general convexity to this part, called *the back of the hand*, and a correſponding cavity on the oppoſite ſide of it, or *palm.*

The inferior ends are articular knobs or balls; they join with the digital bones.

The one which ſupports the thumb is the ſtrongeſt but ſhorteſt.

In the three interſtices between thoſe of the other fingers are lodged two orders of muſcles, from ſituation, called *interoſſeous.*

The Digital Bones.

The thumb has two bones; each finger, beſides, has three, and are ſaid, according to place, to be of the firſt, ſecond, or third phalanx.

The upper ends of thoſe of the firſt phalanx of the fingers, are cavities ſuited to the ends of the metacarpal bones, already mentioned.

Their bodies arch a little backwards, agreeably to the general figure of the hand; the hollow portions are flattened, and ſomewhat grooved longitudinally, to tranſmit tendons.

The low ends are each like the half of a hinge, by which it happens, that flexion and extenſion are the only motions of the finger joints; whereas a rolling one is alſo allowed between their upper ends and the metacarpal bones.

The bones of the remaining phalanges of the thumb and fingers much reſemble one another, and thoſe deſcribed. Thoſe of the laſt that ſupport the nails are ſmalleſt, and their low ends are rounded and ſcabrous. Their motion is entirely that of a proper hinge; the accurate cloſing and opening of the hand is its effect.

Inferior Extremities.

Each is complexly, and commonly called *leg;* but is anatomically conſidered as made up of

1. The thigh,
2. The leg,
3. The foot.

The thigh has

The Os femoris, or thigh-bone.

The leg contains

1. The tibia,
2. The rotula,
3. The fibula.

The bones of the foot are,

Seven tarſal,
Five metatarſal,
Fourteen digital.

There is in general a ſtrong ſimilarity between the bones of this extremity and thoſe of the ſuperior one.

The Os Femoris.

This is the longeſt piece of the oſſeous ſyſtem.

The upper end is formed into a larger ſhare of a *ſphere* or *ball* than that of the os humeri, proportioned to the ſize and depth of the acetabulum that receives it. Its margin gives fixing to the inferior edge of the capſular ligament; the upper one being inſerted into the whole of the brim of the acetabulum.

This ball, or head, bears a ſtrong impreſſion, that anſwers to one in the acetabulum, deſcribed above. Between thoſe is ſtretched a flattiſh ligament, entirely included within the capſular one, named *internal ligament* of the thigh or hip joint.

The head is ſupported by a *neck* (cervix) of conſiderable length, which ſtands outwards, and makes an obtuſe inward angle with the body of the bone.

Two remarkable tuberoſities, not a little ſimilar to thoſe on the upper part of the os humeri, are ſituated near the neck, and named *trochanters*, from office.

The *great* trochanter, which ſeems to be an expanded continuation of the body, is on the outer and upper part, and has many muſcular impreſſions. It can be diſtinguiſhed without diſſection, and indicates the true ſituation in caſes of *fracture* and *diſlocation*.

The *ſmall* trochanter points ſomewhat to the *thyroid hole*, and is conſequently on the inner and under part of this end; it a good deal reſembles the maſtoid proceſs of the temporal bone.

The body, ſomewhat rounded, is much like to that of the os humeri. It arches conſiderably forwards, by which its ſtrength, in that direction, is increaſed, and additional ſpace on the back part is acquired to lodge and protect the muſcles, veſſels, &c. during various attitudes. A conſtruction ſo univerſal ought not to be aſcribed to partial cauſes, as dreſs, manner of carrying infants, ſitting, &c.

On the hind part of the body is a longitudinal *rough line* (linea aſpera). At the top this divides into two, which run each to a trochanter. The like happens at the bottom, and the branches run to the condyles.

Muſcles are inſerted into this line through its whole courſe.

The inferior end of this bone is bulbous, articular, and condyloid, for being joined with the *tibia*.

The two *condyles* are very diſtinct, and eminent behind or towards the ham; the internal is the largeſt. The interſtice is a notch capable to lodge the finger, and conſequently affords ſafe tranſmiſſion to the veſſels, &c. during the various motions.

Into the interſtice, towards the neck and back part, the ends of two internal ligaments from the tibia, named *croſs* ligaments, are fixed.

The diſtinction of the condyles becomes more faint towards the fore part, and produces the appearance of a pully, (trochlea,) like that on the os humeri for the ulna.

This pully is included within the capſular ligament, becauſe the rotula glides proportionally on it in every motion of the joint.

On the ſide of each condyle, immediately without the capſular ligament, is a *tuberoſity*. Theſe are analogous to the condyles, as they are called, of the os humeri, and, like them, afford attachment to muſcles.

When the thigh bone is placed perpendicularly, the internal condyle is loweſt, a circumſtance abſolutely neceſſary to place the two on the ſame level, when reduced to the oblique or natural poſture, which is productive of much advantage.

The hip joint is the moſt perfect inſtance of the ball and ſocket kind; it accordingly enjoys extenſive motion in every direction: It is indeed ſomewhat hampered above and behind, by the high brim of the cotyloid cavity, and the internal ligament.

When flexion and extenſion of the thigh bone, with reſpect to the trunk, are performed, the head rolls about its axis ; which is conſtantly the caſe in walking.

The great burden ſuſtained by the inferior extremity during the ſtanding poſture, called for *a fixed fulcrum*, a deep cavity, and ſtrong ligaments to this bone ; and ſubjects it peculiarly to fracture of the neck, which has often been miſtaken for luxation.

It is obvious that a diſlocation cannot happen in the hip joint without a laceration of the ligaments, unleſs theſe have been previouſly altered by diſeaſe.

When the head of the thigh bone is diſplaced in an upward direction, the leg is ſhortened and the foot and toes are turned inwards ; When in a forward one, the leg is likewiſe ſomewhat ſhortened, the head of the bone can be perceived in the groin, and the foot and toes are turned outwards ; but when forced downwards, the leg is rather lengthened, and the foot may have the outward or inward poſition, according as the head is behind or before the os iſchii.

Such is the diſpoſition of the ſoft parts on the inferior end of this bone, that it may be felt through them, and an idea acquired as to fracture, tumour, &c.

The great abundance of muſcles around the body of this bone, eſpecially its upper ſide, renders it often a difficult taſk to the Surgeon to diſcover its diſeaſes, particularly fracture, and ſucceſsfully to purſue the proper plan of cure.

The Tibia.

This has derived its name from ſome ſimilitude to a muſical pipe.

It is the principal bone of the *leg*, like as the ulna is of the fore-arm.

The upper part is bulbous, and of an extent correſponding to the adjacent extremity of the os femoris, with which it is ſolely connected.

The top has two cavities that receive the condyles of the thigh bone; the internal is deepeſt: They are ſeparated by a rough eminence, into which the low ends of the croſs and internal ligaments, one before the other, are fixed.

In each cavity is placed an inter-articular cartilage, like thoſe of the under jaw, named *ſemilunar*. Their angles (cornua) are turned to and connected with one another, while their convexities adhere to the capſular ligament.

Subſtances called *ſynovial glands* lie between the cartilages, ſo that the common capſular ligament incloſes the whole.

The line ſurrounding the articular ſurface, to which the low edge of the capſular ligament adheres, is eaſily viſible: Below it, on the fore-part, is a hollow followed by a *ſcabrous eminence*, on which one reſts while kneeling, and to the upper part of this the ſtrong ligament of the patella adheres. Both can be well felt without diſſection.

On the outer and under ſide of this end is a ſmall articular ſurface, to which the fibula is connected by a capſular apparatus, ſo as to have an obſcure motion. This joint can be felt although the covering parts be not removed.

The body is triangular; the foremoſt angle, called *ſhin*, is ſomewhat waved, like an italic *ſ*, and can be traced by the finger; a circumſtancce from which the Surgeon may aſcertain the condition of the bone as to facture, &c.

The angle that is turned to the fibula is the moſt acute, and ſupports the edge of the interoſſeous ligament.

The low end is conſiderably enlarged, and its under ſurface is hollowed tranſverſely, to be articulated with the foot. On its inner end is a proceſs, named *inner ankle*, (malleolus internus) which, with reſpect to the correſponding point of the head, is placed ſomewhat forwards, and thus gives the graceful obliquity of the foot, and regulates the ſetting of fractures, &c.

At the end of the cavity, oppoſite to the inner ankle, but a little more backwards, is a hollow that receives the inferior end of the fibula or *outer ankle*, (malleolus externus.)

The Rotula.

This is often named *patella* or *knee-pan ;* its figure is ſomewhat oval when viewed from before or behind.

The upper edge is a little thickened and flattened, to admit of a ſtrong connection with the muſcles placed on the fore part of the thigh which extend the leg.

The under edge is ſomewhat pointed, to be connected with a ſtrong ligament, mentioned above, that ties it to the ſcabrous ſurface near the head of the tibia.

The poſterior face is articular, and makes a part of the common ſurface of the cavity of the joint, ſo that the capſular ligament adheres to its whole circumference, and leaves a viſible impreſſion.

The anterior face is covered with longitudinal ſmall depreſſions or lines, cauſed by the tendinous expanſion, which entirely covers it, and is continued upon the ligaments and tibia.

As the ligament of the patella is unyielding, it is obvious that this bone muſt follow the motion of the tibia, or be moved along with it; or, in other words, that it is a flexible proceſs of the tibia, and in office not a little reſembling the olecranon.

It is excellently calculated to protect the joint, acting like a ſhield on the fore part, and at ſame time to increaſe the extending power of the leg and to diminiſh friction.

The knee joint is in general only capable of flexion and extenſion: When, however, it is in the former ſtate, the tibia is allowed to roll ſomewhat about its axis on the internal condyle of the os femoris.

The great extent of the touching ſurfaces of the bones which make up this joint, the ſtrength of the tendons, and the number of the ſurrounding ligaments, give much ſecurity againſt luxation; which accordingly ſeldom happens, and is eaſily detected, as the bones are near the ſurface.

The patella affected by violence, acting laterally, is ſometimes diſplaced to one ſide: The extended poſture of the leg favours reduction, by ſlackening the connected parts.

It is ſometimes fractured more or leſs tranſverſely, by exceſſive exertion, &c. an accident immediately followed with inability of extenſion, ſtanding, &c. and diſcoverable by the touch. The extended poſture of the limb is neceſſary to the reduction and retention.

The peculiarly extenſive and very frequent motion of the knee joint, together with its complicated ſtructure, render it liable to various diſeaſes, eſpecially *white ſwelling*, (hydarthrus) which often either proceeds from, or produces an affection of the ends of the bones concerned, ſuch as tumour, perceptible externally.

An effuſion and collection of matter into the cavity of the joint is a common circumſtance of white ſwelling; which is beſt felt by the finger preſſed near the ſides of the patella, becauſe the covering parts are there the thinneſt.

The poſſibility of amputating the touching diſeaſed ends of the os femoris and tibia, ſo as to favour a concretion, by which thoſe bones become one, is obvious.

The Fibula.

This ſlender bone, which ſeems to have received its name from its figure, is placed externally and ſomewhat backwards as to the tibia, and is nearly of the ſame length with it.

The upper end has an articular ſurface connected with the head of the tibia, as already deſcribed.

The body is triangular, and the innermoſt angle, the moſt acute, ſupports the edge of the interoſſeous ligament.

The lower end forms the outer ankle, as has been mentioned, for which purpoſe it is articular, ſo as to be lodged in the notch of the tibia, and to project downwards to complete the joint, while the capſular ligaments allow a ſmall degree of ſliding that is highly uſeful.

A ſmall rode or line may be paſſed, without touching either bone, between the tibiæ and fibulæ of both legs at once, of the well formed ſkeleton.

This bone is favourable to the attachment and ſupport of muſcles, and much ſubſervient to the ankle joint. A fracture of it often accompanies a diſlocation of the ankle.

The Tarſal Bones.

The ſeven bones of the tarſus are,

1. Aſtragalus.
2. Os calcis.
3. Os Naviculare, or ſcaphoides.
4. Os cuneiforme internum.
5. Os cuneiforme medium.
6. Os cuneiforme externum.
7. Os cuboides.

Aſtragalus.

This is the uppermoſt, and has a trochlea or pully ſurface, which is received into the cavity of the leg bones, between the ankles, to favour which it is articular on its ſides.

The under part is ſupported by a broad ſurface on the os calcis, while the anterior one is applied to the os cuboides; and both connected by capſular apparatus, ſo as to allow the ſliding but limited motion.

The ankle joint is principally a hinge; however, beſides flexion and extenſion, it is capable of a conſiderable quantity of lateral motion, which allows the foot to tread ſecurely on ſurfaces not level. A high degree of the lateral inclination gives pain, ſtrain, and luxation, with laceration of the ligaments, and ſometimes fracture of the fibula a little above the ankle: Theſe unqueſtionably would more frequently occur did not the fibula, to a certain degree, recede.

Diſlocation in the ankle joint, which is eaſily diſcoverable, becauſe the ſoft parts are ſcanty, may be forwards or backwards.

Os Calcis.

This, which is the heel-bone, is undermoſt, and completes the foot behind by a ſcabrous ſurface, on which a great ſhare of the weight of the whole body falls while one ſtands.

It projects conſiderably behind the aſtragalus, and conſequently the tibia; and, to its extremity, is fixed the ſtrong combined tendon of the extending muſcles of the foot, named *tendo Achillis.*

In a forward diſlocation the ends of the leg-bones reſt on its upper ſurface.

The anterior part is artfully accommodated to be articulated with the aſtragalus by a ſlanting face, and with the os cuboides by a tranſverſe one.

The ſide which reſpects the inner ankle is much hollowed towards the under part, and thus gives convenient tranſmiſſion to veſſels, &c. which would otherwiſe be injured by preſſure.

Os Naviculare.

This bone, named from ſhape, is interpoſed between the aſtragalus and cuneiform bones; for which it has correſponding ſurfaces.

Oſſa Cuneiformia.

Theſe three bones, with the os cuboides, on the outſide, conſtitute a row, and complete the tarſal part of the foot before, and ſupport the metatarſal bones of the great and two adjoining toes; while they are themſelves chiefly connected behind with the os naviculare.

Os Cuboides.

This is ſituated at the outer end of the row now mentioned, which it completes, as alſo the tarſus on the ſide of the little toe; the metatarſal bone of which, and that of the adjoining toe, it ſupports before, while it is itſelf ſupported behind by the os calcis.

The ſtructure of the tarſal bones is nearly the ſame with that of the carpal ones. They are ſo arranged as to form an arch, whoſe concavity is conſiderable, and reſpects the ſole of the foot lodging and protecting the muſcles and other parts.

No point of this arch, in the ſtanding attitude, touches the ſurface on which one trades, except the heel, which may be conſidered as its poſterior abutment; the metatarſal bones, and thoſe of the toes, are the anterior one.

The excellence of this tarſal arch is, that, while it is ſufficiently ſtrong, it poſſeſſes a diffuſed elaſticity, derived from its pieces; becauſe each has a ſmall degree of gliding motion, which, upon the whole, is conſiderable, ſo that the body reſts upon a ſpring: By this means concuſſion in jumping, running, &c. is wonderfully eluded.

Amputation of the foot entirely may be made at the ankle joint, and an artificial foot ſubſtituted. It ſeems proper to ſaw off the tips of the ankles, ſo as to give a ſurface favourable to healing, and to ſuffer neceſſary preſſure.

Partial amputation of the foot may be performed without the uſe of the ſaw, either immediately before the aſtragalus and os calcis, or before the tarſal bones altogether, by which a very uſeful ſhare of the foot may be preſerved, while a wound, as favourable as may be for healing, is procured.

Metatarſal Bones.

Theſe greatly reſemble the metacarpal ones, and have nearly the ſame diſpoſition with reſpect to one another: Betwixt the four ſmaller ones, *interoſſeous* muſcles are placed.

The metatarſal bone of the great toe is by far the largeſt and ſtrongeſt: Its anterior end is remarkably bulbous; on which, and the metatarſal bone of the little toe, the arch above deſcribed, which is lengthened by the bones in queſtion, is ſupported before.

The anterior extremities of theſe bones is the fore boundary of the *hollow* or *ſole* of the foot.

Digital Bones.

Theſe, except their ſize, which is ſmaller, are exceedingly ſimilar to the finger-bones, and enjoy the ſame kinds of motion

Seſamoid Bones.

Two ſmall flattiſh bones, named *ſeſamoid* from figure, are pretty conſtantly found on the under parts of the metatarſal joints of the great toes, one in each. They are connected with the capſular ligaments and tendons, much like the rotula, which may be conſidered as a larger ſeſamoid bone.

A Scheme of the Articulations.

To arrange methodically the various kinds of articulations has not a little perplexed anatomiſts: The following ſcheme is perhaps as ſimple and ſatisfactory as any.

ARTICULATION has

I. MOTION, and is,

1. A BALL-and-SOCKET; (*Enarthroſis, Diarthrodia*, &c.) viz.

The ſcapula with the os humeri:
The os innominatum with the os femoris:
The bones of the fore-arm with thoſe of the carpus:
The metacarpal with the finger bones:
The metatarſal with the toe bones:

2. A HINGE; (*Ginglimus*) viz.

The ſkull with the lower jaw:
The firſt vertebra with the ſecond one:
The arm bone with the fore-arm ones:
The radius with the ulna:
The finger bones with one another:
The toe bones with one another:

3. A SLIDER; (*Articulatio planiformis*) viz.

The oblique proceſſes of the vertebræ with one another:
The clavicle with the ſcapula:
The clavicle with the ſternum:
The ribs with the vertebræ:
The patella with the thigh bone:
The carpal bones with one another:
The tarſal bones with one another:

II. No Motion, and is,

1. Suture; *(Sutura)* viz.

The cranial bones with one another:
The facial bones with one another:

2. Concretion; *(Symphyſis, Gomphoſis)* viz.

The bodies of the vertebræ with one another:
The bones of the pelvis with one another:
The ribs with their cartilages:
The teeth with their ſockets.

MYOLOGY.

MYOLOGY.

THE particular myology may firſt attend to the muſcles on the fore part of the body, proceeding from above downwards, and thereafter purſue the like method as to thoſe on its back part.

I. MUSCLES OF THE FACE.

Occipito-Frontalis.

This muſcle is azygous.

Origin. The tranſverſe line of the os occipitis.

It ſoon becomes a broad aponeuroſis, covering the ſmooth ſegment of the ſkull over the pericranium, on which it glides, by the intervention of a looſe cellular ſubſtance; while its other ſurface is cloſely adherent to the integuments, which, of courſe, follow its motions.

Near the bottom of the forehead, eſpecially above each eye-brow, is the frontal expanſion; ſo that this is a digaſtric muſcle.

Inſertion. The eye-brows and muſcles of the eye-lids.

Uſe. To move the integuments of the upper part of the ſkull, and ſuſpend the eye-brows. During action the frontal approaches the occipital part.

In contuſions and wounds the fluids are readily effuſed into the cellular ſubſtance between this muſcle and the pericranium, and produce inflamation frequently of the eryſipelatous kind, and dangerous; to prevent which the Surgeon ought to provide a free and dependent vent.

Corrugator Supercilii.

Origin. The internal angular proceſs of the os frontis.

Inſertion. The bottom of the frontal part of the occipito-frontalis muſcle.

Uſe. To corrugate the eye brows.

Orbicularis Palpebrarum.

This is a thin expanſion: It lies on the eye lids, and ſurrounds their opening like a ſphincter.

Origin. The naſal proceſs of the ſuperior maxillary bone, and inner angle of the orbit around a ſmall tendon, which can be felt without inciſion. The fibres ſeem, after ſweeping along beyond the outer angle, and covering a portion of the temple, to be returned like circular lines to their origin.

Uſe. To ſhut the eye lids with various firmneſs.

As the tendon and part of this muſcle lie over the lacrymal ſac, they are divided, in the operation, for fiſtula lacrymalis, but without any bad effect.

Levator Palpebræ Superioris.

Origin. The upper part of the margin of the optic hole in the bottom of the orbit.

Inſertion. The poſterior edge of the cartilage of the upper eye-lid, named *tarſus.*

Uſe. To raiſe the upper eye-lid, and, conſequently, to counteract the orbicularis palpebrarum: The alternate action of theſe muſcles produces twinkling or winking.

Compreſſor Naſi.

Origin. The anterior edge of the naſal and adjoining one of the maxillary bones.

Inſertion. The root of the cartilaginous part of the noſtril.

Uſe. To narrow the noſtril.

Levator Anguli oris.

Origin. The maxillary bone near the firſt grinder.

Inſertion. The angle of the mouth, and the under lip.

Uſe. To raiſe the angle of the mouth.

Levator Labii Superioris Alæque Naſi.

Origin. The inferior part of the brim of the orbit, near the noſe, and the naſal proceſs of the maxillary bone, near the os frontis.

Inſertion. The upper lip and ala naſi.

Uſe. To move the inſertion upwards.

Depreſſor Labii Superioris Alæque Naſi.

Origin. The outer ſurface of the ſuperior maxillary bone, near the canine, and two adjoining inciſor teeth.

Inſertion. The upper lip and ala naſi.

Uſe. To depreſs the inſertion.

Depreſſor Anguli oris.

Origin. The baſe of the under jaw, near the chin.

Inſertion. The zygomaticus major, levator anguli oris, and angle of the mouth.
Uſe. To depreſs the inſertion.

Depreſſor Labii Inferioris.

Origin. The baſe of the under jaw, next the chin.
Inſertion. The under lip.
Uſe. To draw down the inſertion.

Levator Labii Inferioris

Origin. The outer ſurface of the lower jaw near the canine, and two adjacent inciſor teeth.
Inſertion. The under lip.
Uſe. To raiſe the inſertion.

Zygomaticus Major.

Origin. The Zygomatic proceſs of the cheek bone.
Inſertion. The angle of the mouth.
Uſe. To raiſe obliquely the inſertion.

Zygomaticus Minor.

Origin. The middle ſurface of the cheek bone.
Inſertion. The upper lip, near the angle of the mouth.
Uſe. To raiſe the inſertion obliquely.

Buccinator.

Origin. The fore part of the coronoid proceſs of the under jaw, the conſtrictor pharyngis superior between the jaws, and the end of the alveolary proceſs of the upper jaw.

Inſertion. The angle of the mouth.

Uſe. To draw the angle of the mouth outwards, and to compreſs the morſel, &c.

This muſcle has a perforation for tranſmitting the end of the parotid duct, nearly oppoſite to the root of the third upper grinder.

Orbicularis Oris.

This ſeems to be produced by the muſcles of the lips; it much reſembles the orbicularis oculi, and is a real ſphincter. The teguments reflected over it form the borders of the lips.

A native diviſion of the upper part of this muſcle and the integuments is *hare-lip.*

2. MUSCLES OF THE EXTERNAL EAR.

Attollens Aurem.

Origin. The temporal edge of the aponeuroſis of the occipito-frontalis muſcle.

Inſertion. The upper part of the tube of the external ear.

Uſe. To incline the inſertion upwards.

Anterior Auris.

Origin. The Temporal part of the zygoma.

Inſertion. The anterior ſide of the tube of the external ear.

Uſe. To draw the inſertion forewards.

Retrahens

Retrahens Aurem.

Origin. Two points on the hind and external ſurface of the maſtoid proceſs.

Inſertion. The back part of the tube of the ear.

Uſe. To move the inſertion backwards.

Theſe muſcles are very thin and powerleſs in the human kind.

3. MUSCLES OF THE EYE-BALL.

Levator Oculi.

Origin. The upper part of the margin of the optic hole.

Inſertion. The upper and fore part of the eye-ball; its tendon is thin and broad.

Uſe. To raiſe the fore part of the eye-ball.

Depreſſor Oculi.

Origin. The inferior part of the margin of the optic hole.

Inſertion. The under and fore part of the eye-ball; its tendon is like that of the former muſcle.

Uſe. To draw the inſertion downwards.

Adductor Oculi.

Origin. The inner part of the margin of the optic hole.

Inſertion. The inner and fore part of the eye-ball; its tendon is like that of the former.

Uſe. To draw the inſertion towards the noſe.

Abductor Oculi.

Origin. The outer part of the margin of the optic hole.

Inſertion. The outer and fore part of the eye-ball; its tendon is like the former one.

Uſe. To draw the inſertion outwards.

Theſe four muſcles, nearly equidiſtant from one another, diverge proportionally as they proceed forward; and on this account are named *ſtraight*, (recti) as a diſtinction likewiſe from the two following, which are termed *oblique*, (obliqui).

Obliquus Superior, or *Trochlearis.*

Origin. The margin of the optic hole between the levator and adductor; its ſmall tendon paſſes through a cartilaginous *ring* (trochlea) fixed to the internal angular proceſs of the frontal bone, and is then reflected outwards.

Inſertion. The eye-ball a little backwards between the tendons of the levator and abductor.

Uſe. To roll the eye-ball inwards, and to fix it ſo as to reſiſt the retraction of the ſtraight muſcles.

Obliquus Inferior.

Origin. Outer edge of the orbitar proceſs of the ſuperior maxillary bone, near the os unguis.

Inſertion. The eye-ball, behind the tendon of the abductor.

Uſe. To roll the eye-ball inwards, and to aſſiſt the former one in fixing it.

Deformity or diſeaſe of theſe muſcles muſt much affect the motion, appearance, and uſe of the eye-ball, and give various degrees of the *ſquint eye.*

4. MUSCLES OF THE UNDER JAW.

Temporalis.

Origin. The external angular proceſs of the frontal bone; the temporal proceſs of the ſpenoidal and lateral and lower partof the parietal bone: The whole extent is ſomewhat ſemicircular: The converging fibres paſs under the zygoma, and are covered by an expanſion from the edge of the apeneuroſis of the occipito-frontalis, that is connected with the upper edge of the zygoma.

Inſertion. The whole of the coronoid proceſs of the under jaw.

Uſe. To move the under jaw upwards and preſs it againſt the other.

The Surgeon is often obliged to carry inciſions through the upper part of this muſcle, in caſes of fracture requiring the trepan, &c. I have never known any bad conſequence from this meaſure.

Maſſeter.

Origin. The ſuperior maxillary bone, near the cheek one, and the fore part of the zygoma.

Inſertion. The outſide of the root of the coronoid proceſs, the angle and part of the baſe of the under jaw.

Uſe. To aſſiſt the former.

The parotid duct paſſes tranſverſely before the body of this muſcle on its way to the buccinator one.

Pterygoidæus

Pterygoidæus Externus

Origin. The external ala of the pterygoid proceſs of the ſphenoidal bone, and the vicinity.

Inſertion. The lower jaw near the condyloid proceſs.

Uſe. To produce the grinding or oblique motion of the under jaw.

Pterygoidæus Internus.

Origin. The internal ala of the pterygoid proceſs of the ſpenoidal bone, and the vicinity.

Inſertion. The internal ſurface of the angle of the under jaw.

Uſe. To aſſiſt the former muſcle.

5. MUSCLES ON THE NECK.

Platyſma Myoides.

Origin. The cellular ſubſtance on the cheſt below the clavicle and acromion.

It covers the ſide of the neck and touches its fellow on the fore part; the integuments adhere cloſely to its outer ſurface through its whole extent.

Inſertion. The baſe of the under jaw from the angle to the chin nearly, ſtretching ſomewhat upwards.

Uſe. To keep the integuments duly applied.

This muſcle is neceſſarily wounded when phlebotomy is performed in the jugular veins. The inciſion for bronchotomy is made between the two muſcles.

Sterno-cleido-Maſtoidæus.

This is the ſtrongeſt and longeſt of the anterior muſcles of the neck.

Origin. The upper edge of the ſternum and adjoining ſurface of the clavicle.

It extends obliquely upwards, backwards, and outwards. In one caſe the ſternal part extended much downwards by the edge of the breaſt bone.

Inſertion. Maſtoid proceſs and adjoining ſurface ſomewhat backwards.

Uſe. To incline the head when both act, and to turn the face to the oppoſite ſide when one acts.

A contraction or ſhortening of one of theſe gives the *wry-neck*, which it is propoſed to remedy by cutting the muſcle entirely aſunder. The Surgeon ought to be certain that the fault is altogether in the muſcle, before he proceed to the operation.

Omo-hyoidæus.

Origin. The fore part of the ſuperior coſta of the ſcapula.

It has a tendinous portion behind the former muſcle.

The courſe of it is upwards, forwards, and inwards.

Inſertion. The ſide of the baſe of the os hyoides.

Uſe. To draw the inſertion laterally downwards.

Sterno-hyoidæus

Origin. The inner ſurface of the angle of the ſternum and neighbourhood.

Inſertion The fore part of the baſe of the os hyoides.

Uſe. To move the inſertion downwards.

Sterno-thyrodæus.

Origin. One half of the upper edge of the ſternum internally.

Inſertion. The inferior edge of the thyroid cartilage.

Uſe. To move the inſertion downwards, and conſequently the parts attached to it.

The inciſion for bronchotomy ought to be in the interſtice of this pair of muſcles, which is very ſmall.

Hyo-thyroidæus.

Origin. The upper edge of the thyroid cartilage.

Inſertion. The appendix of the os hyoides.

Uſe. To move the inſertion downwards, and vice verſa.

Crico-thyroidæus.

Origin. The lateral and fore part of the cricoid cartilage.

Inſertion. The adjoining edge of the thyroid cartilage.

Uſe. To move the inſertion downwards.

6. MUSCLES BETWEEN THE UNDER JAW AND OS HYOIDES.

Digaſtricus.

This has a tendon in its middle, hence the name.

Origin. The foſſa behind the maſtoid proceſs. The tendon paſſes through or is connected with the ſtylo-hoidæus muſcle near the end of the body of the os hyoides.

Inſertion. The loweſt and middle point of the the concavity of the under jaw, immediately behind the chin: It touches its fellow.

Uſe. To move the inſertion obliquely downwards; and when this is fixed, to raiſe the os hyoides and attached parts.

Mylo-hyoidæus.

Origin. The internal ſurface of the under jaw, above the baſe, nearly from the angle to the middle of the chin.

Inſertion. The lower edge of the baſis of the os hyoides.

Uſe. To approximate the parts to which it is attached mutually, according as the one or other is the moſt fixed.

Genio-hyoidæus.

Origin. A rough protuberance on the middle of the concavity of the under jaw, near the inſertion of the digaſtricus.

Inſertion. The baſe of the os hyoides.

Uſe. To aſſiſt the former.

Genio-gloſſus.

Origin. The protuberance of the under jaw mentioned above.

Its fibres diverge from one another like rays.

Inſertion. The tongue and os hyoïdes.

Uſe. To move the inſertion towards the origin.

Hyo-gloſſus.

Origin. The baſe and cornu of the os hyoides.

Inſertion. The ſide of the tongue.

Uſe. To move the inſertion downwards.

Lingualis.

Origin. The root or hind part of the tongue.

It lies between the hyo-gloſſus and the genio-gloſſus.

Inſertion. The tip of the tongue.

Uſe. To ſhorten the tongue.

Stylo-gloſſus.

Origin. The ſtyoloid proceſs of the temporal bone, towards its point.

Inſertion. The root of the tongue laterally.

Uſe. To move the inſertion ſomewhat backwards and downwards.

Stylo-hyoidæus.

Orign. The middle and inferior part of the ſtyloid proceſs, near the former.

Inſertion. The os hyoides laterally, near which it is perforated as mentioned.

This muſcle has been obſerved to be double.

Uſe. To move the inſertion upwards and backwards.

Styo-pharyngæus.

Origin. The root of the ſtyloid proceſs above the former.

Inſertion. The ſide of the pharynx.

Uſe. To elevate the inſertion.

7. MUSCLES OF THE VELUM PALATI.

The *velum palati*, *moveable palate*, or *valve of the poſterior nares*, as it may be called, is about two inches long, and is extended from the oſſeous palate backwards, and terminates by a nipple-like point, named *uvula* and *pap of the throat.*

The upper ſurface reſpects the poſterior openings of the noſe and cuneiforme proceſs of the occipital bone.

The under ſurface can be ſeen and felt in one's ſelf.

The ſpace beyond the root of the tongue, and before the ſuperior cervical vertebræ, in the upper part of which the velum is ſituated, is called *fauces*, or *top of the throat* or *gullet* (pharynx).

A contraction immediately between the root of the tongue and the velum, or the paſſage from the mouth to the throat, is called *iſthmus faucium.*

The velum is moſtly muſcular, and covered by the integuments continued from the adjacent ſurfaces.

Circumflexus, or *Tenſor Palati.*

Origin. Spinous proceſs of the ſphenoidal bone and vicinity. It ſtretches down along the pterygoidæus internus to the hook of the internal pterygoid ala, and paſſes its ſmall tendon over it.

Inſertion. The adjacent edge of the velum palati.

Uſe. To move the inſertion in a lateral direction.

Levator Palati.

Origin. The margin of the Euſtachian tube of the temporal bone.

This muſcle is of conſiderable breadth, and tends downwards.

Inſertion. The whole of the adjacent edge of the velum palati.

Uſe. To raiſe the velum palati, and apply it like a valve to the poſterior nares.

Conſtrictor Iſthmi Faucium.

Origin. The ſide of the root of the tongue.

It runs backwards or upwards, ſo as to form a viſible arch under the integuments, named *anterior arch of the iſthmus.*

Inſertion. The middle of the velum, near the uvula.

Uſe. To depreſs the velum and ſhut the iſthmus.

Palato-pharyngæus.

Oirigin. The upper and hind part of the thyroid cartilage, and ſomewhat of the adjacent ſurface of the pharynx.

This muſcle runs forwards and upwards, and forms an arch like the former, called *poſterior arch* of the iſthmus.

In the angular interſtice between theſe arches is ſituated a notable gland, called *amygdala*, or *almond of the ear.*

Inſertion. The velum near the root of the uvula.

Uſe. To aſſiſt the former muſcle.

AZYGOS UVULÆ.

As the name implies this is an azygous muſcle.

Oirigin. The middle of the hind edge of the oſſeous palate.

Inſertion. The uvula.

Uſe. To raiſe and ſhorten the velum palati.

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8. MUSCLES OF THE LARYNX.

The larynx is the upper part or beginning of the *wind-pipe*, (trachea) and chiefly conſiſts of five cartilages, moved by ſmall muſcles, viz.

1. Thyroides.
2. Cricoides.
3. and 4. Arytenoides.
5. Epiglottis.

The opening which forms the communication between the trachea and the fauces, is a *chink*, (rima) called *glottis.*

A particular deſcription of theſe cartilages belongs to that of the lungs, or to the chondriology.

Crico-arytenoidæus poſticus.

Origin. The back part of the cricoid cartilage.

Inſertion. The baſe of the arytenoid cartilage.

Uſe. To dilate the glottis.

Crico-arytenoidæus lateralis.

Origin. The cricoid cartilage laterally.

Inſertion. The arytenoid cartilage, near the former.

Uſe. To co-operate with the foregoing one.

Arytenoidæus obliquus.

Origin. The baſe of one arytenoid cartilage.

It croſſes its fellow.

Inſertion. The point of the other arytenoid cartilage.

Uſe. To approximate mutually the points of inſertion.

Arytenoidæus tranſverſus.

This is azygous.

Origin. The ſide of one arytenoid cartilage.

Inſertion. The ſide of the oppoſite arytenoid cartilage.

Uſe. To narrow the glottis.

Thyro-arytenoidæus.

Origin. The poſterior and lateral part of the thyroid cartilage.

Inſertion. The adjacent arytenoid cartilage.

Uſe. To move the point of inſertion downwards.

Thyro-epiglotidæus.

Origin. The thyroid cartilage near the former.

Inſertion. The epiglottis laterally.

Uſe. To cover the glottis, by depreſſing the epiglottis.

Aryteno-epiglotidæus.

Origin. The lateral and upper part of the arytenoid cartilage.

Inſertion. The epiglottis, near the former.

Uſe. To aſſiſt the former.

9. MUSCLES OF THE ABDOMEN.

When the abdominal integuments are properly removed, one ſees,

1. The *linea alba*, or *white line*, extended between the point of the breaſt bone and ſymphyſis pubis, of various breadth. It is formed by croſſing tendons.

2. The *umbilicus*, or *navel*, which is an opening, or ring, about the middle of the linea alba, that before birth tranſmits veſſels, therefore named *umbilical*. *Exomphalus*, or umbilical hernia,

takes place through this. The adjacent ſurface is termed *umbilical region;* that above is *epigaſtrium*, or *epigaſtric region;* and that below *hypogaſtrium*, or *hypogaſtric region;* becauſe the former is *above* the ſtomach when the body lies, and the latter *under* it when ſtanding. The lateral parts of the epigaſtric region are called *hypochondria*, right and left, from the ſubjacent *cartilages* of the falſe ribs; and thoſe of the hypogaſtric region *inguina*, or *groins*.

3. *Linea ſemilunaris*, or *ſemilunar line*, one on each ſide, at ſome diſtance from the linea alba, and likewiſe tendinous.

4. Two or three tendinous interſections placed tranſverſely between the upper parts of the ſemilunar lines. One is always at the umbilicus.

Obliquus externus, or deſcendens.

Origin. The inferior edges of the eight undermoſt ribs, like ſaw-teeth, therefore ſaid to be *ſerrated.*

The fibres deſcend more or leſs obliquely (hence the name), and become tendinous.

Inſertion. The poſterior and external edge of the ſpine of the os ilium, and the linea alba through its whole length, and oſſa pubis.

From the anterior ſuperior ſpinous proceſs, to the os pubis, the edge of the tendon is extended, ſomewhat like a cord, and therefore improperly called *ligament* of FALLOPIUS and PAUPART, from which a thin aproneuroſis is ſpread over the groin and inguinal glands. The inferior angle, near the os pubis, has a ſlit, commonly called a *ring*, to tranſmit obliquely downwards the ſpermatic veſſels in the male, and the end of the long uterine ligament in the female.

Behind PAUPART's ligament, which can be felt in the entire ſubject, the ſpace is conſiderable, and moſt ſo in the female, who, on this account, is peculiarly liable to *femoral hernia.* It tranſmits the crural veſſels and nerves, and ought to be well known to the Surgeon.

The rings, or rather ſlits, of the tendons of the oblique muſcles give occaſion to *hernia*, eſpecially in the male, named *bubonocele*, *inguinal* and *ſcrotal.*

When the parts are impacted in the ring, the hernia is ſaid to be *incarcerated* or *ſtrangulated.* The operation for bubonocele therefore conſiſts in dilating the ring duly by inciſion, ſo as to relieve the impaction.

The ſucceſs of this delicate operation much depends on the Surgeon's knowledge of the parts.

Uſe. To ſupport and compreſs proportionably and equably the abdominal contained parts, and to move the cheſt with reſpect to the pelvis.

Obliquus internus or aſcendens.

This lies behind the former.

Origin. The ſpine of the os ilium, from the anterior ſuperior proceſs backwards, the tendon of the latiſſimus dorſi, and PAUPART's ligament.

The courſe of the fibres is obliquely upwards and forwards, hence the name; they become tendinous, like thoſe of the former one.

Inſertion. The end of the ſternum, the cartilages of the ribs from the ſeventh downwards, and the whole length of the linea alba, by two laminæ, *internal* and *external*, leaving an interſtice to contain the rectus muſcle between them.

The linea ſemilunaris is principally formed by the beginning of this double tendon.

The ſpermatic veſſels paſs outwards below the edge of this muſcle, behind PAUPART's ligament, and receive a bundle of fibres that attends them to the ſcrotum, under the name of *cremaſter* muſcle.

The long uterine ligaments go out below it likewiſe, but receive no cremaſter.

Uſe. To co-operate with the former.

Tranſverſalis.

This is placed behind the former, and immediately upon the peritenæum.

Origin. The inner ſurface of PAUPART's ligament, the two anterior thirds of the internal edge of the ſpine of the os ilium, the tranſverſe proceſſes of the undermoſt dorſal, and three or four ſucceeding lumbar vertebræ, and inner ſurfaces of the cartilages of the ſix or ſeven inferior ribs, where the fibres intermix ſomewhat with thoſe of the diaphragm.

The courſe of the muſcle, as its name imports, is tranſverſe. The fibres become tendinous nearly about the linea ſemilunaris.

Inſertion. The point of the ſternum and the linea alba; the inferior third of the tendon paſſes before the rectus muſcle.

Uſe. To aſſiſt the others to give an equable conſtriction.

There is ſome reaſon to conclude, that theſe muſcles may be conſidered juſtly as *digaſtric*, and the linea alba as the middle of the common tendons.

Rectus Abdominis.

This long muſcle is adjacent and paralel to the linea alba.

Origin. The creſt or lip of the os pubis.

Inſertion. The cartilages of the three inferior true ribs.

Tranſeverſe tendinous lines on this muſcle give the white interſections mentioned above, which appear through the anterior ſurface of the ſheath, in which this muſcle is otherwiſe concealed.

Uſe. To ſupport and occaſionally contract the ſpace it occupies, and to bend the cheſt on the pelvis, and vice verſa.

Pyramidalis.

Origin. The creſt of the os pubis, exterior to the rectus.

This, with its fellow, have a pyramidal form, hence the name.

Inſertion. The inferior part of the linea alba, and adjoining edge of the rectus.

Uſe. To ſupport the low end of the rectus. They are ſometimes wanting.

When the abdominal organs are protruded through the interſtices of the abdominal muſcles, or through native or morbid deficiences, or lacerations of them, hernia, named *ventral* and *abdominal*, to diſtinguiſh it from that through any of the uſual openings or rings, is produced. The diſeaſe perhaps has been termed *rupture*, becauſe it is often the effect of force.

The inciſion in that kind of *lithotomy*, named *high operation*, is made into the linea alba, in the interſtice of the pyramidal muſcles, becauſe the bladder of urine to be opened lies behind them.

The inciſion in *pelvitomy* is inflicted in the ſame place.

The *Cæſarean operation* requires an extenſive inciſion by the edge of the linea alba; becauſe it is imagined that tendon heals more difficulty than muſcle.

The puncture for the *aſcites*, or dropſy of the belly, commonly called *tapping* (paracenteſis abdominalis), pervades the obliquus externus, internus, and tranſverſalis; becauſe it is uſually made in a lateral point.

In the interſtices of theſe broad muſcles, collections of matter are ſometimes produced that might be miſtaken for *peritonæal* ones.

Gaſtroraphy or *ſuture* of theſe muſcles when wounded, is an operation not a little difficult, eſpecially if the diviſion be extenſive and tranſverſe.

They are cut in *enterotomy*, and when inciſions are carried to the *liver* and *gall-bladder*.

10. MUSCLES OF THE SHOULDER, AND UPPER PART OF THE ARM.

It is neceſſary to remove theſe muſcles, before a full view of thoſe of the cheſt can be obtained.

Pectoralis Major.

This broad muſcle lies immediately behind the *breaſt* (mamma).

Origin. The cartilages of the ſixth and fifth ribs, intermixed with the fibres of the obliquus externus, nearly all the edge of the ſternum, and anterior half of the clavicle.

The fibres are collected towards the ſhoulder.

Inſertion. The outer edge of the bicipital groove of the os humeri. The tendon is broad and double.

Uſe. To move the arm obliquely forwards.

Pectoralis Minor.

This lies on the ribs, immediately behind the former.

Origin. The fifth, fourth, and third ribs, near their cartilages.

Inſertion. The coracoid proceſs of the ſcapula.

Uſe. To move the inſertion forwards and downwards.

Subclavius.

Origin. The cartilage of the firſt rib.

Inſertion. The clavicle near the coracoid proceſs.

Uſe. To fix the clavicle, and co-operate with the former two.

Trapezius or *Cucularis.*

This is a triangular and extenſive expanſion, immediately within the integuments of the hind part of the neck and cheſt.

Origin. The middle and lateral ſurface of the os occipitis; its fellow behind the ſpines of the cervical vertebræ as low as the fifth; the ſpines themſelves of the ſixth and ſeventh, and all thoſe of the dorſal ones.

Inſertion. The poſterior and upper part of the clavicle, the acromion, and ſpine of the ſcapula.

Uſe. To move the ſhoulder with various degrees of obliquity towards its origin.

The common tendon of theſe muſcles, and which ſhews them to be in ſome reſpects a digaſtric muſcle, where it is looſe behind the cervical ſpines, is improperly called *ligamentum nuchæ.*

Latiſſimus Dorſi.

This is a very broad muſcle, ſituated immediately within the integuments of the back.

Origin. The poſterior part of the ſpine of the os ilium; the ſpinous proceſſes of the os ſacrum, lumbar vertebræ, and ſeven inferior dorſal ones, by an aponeuroſis; alſo the points of the three inferior ribs.

The fibres are collected nearly like thoſe of the pectoralis major, and thus form the poſterior *ala*, or border of the *axilla*, or arm-pit, in the ſame way as the anterior one is formed by the laſt named muſcle.

Inſertion. The inner margin of the bicipital groove of the os humeri, oppoſite to the tendon of the pectoralis major.

Uſe. To move the inſertion downwards, and turn the os humeri ſomewhat about its axis.

Rhomboides.

Origin. The ſpinous proceſſes of the five ſuperior dorſal and three inferior cervical vertebræ.

Inſertion. The whole of the baſe of the ſcapula.

That part below the ſpine has been called *rhomboides major*, and the reſt *rhomboides minor*.

Uſe. To move the ſcapula obliquely backwards.

Levator Scapulæ.

Origin. The tranſverſe proceſſes of the five ſuperior cervical vertebræ.

Inſertion. The ſuperior angle of the ſcapula.

Uſe. To move the ſcapula upwards, or ſhrug the ſhoulder, hence named ſometimes *muſculus patientiæ.*

Serratus Magnus.

Origin. The nine ſuperior ribs, where it forms angles called *ſerræ*, or *digitations*, which intermix with ſome of thoſe of the obliquus externus.

Inſertion. The whole of the baſe of the ſcapula, near the rhomboides.

Uſe. To move the ſcapula obliquely forwards.

II. MUSCLES OF THE CHEST.

Intercoſtalis Externus.

Origin. The external part of the whole of the inferior edge of each rib.

The courſe of the fibres is obliquely forwards.

Inſertion. The external part of the whole of the ſuperior edge of the rib immediately below the origin.

As there are eleven intercoſtal ſpaces, there muſt be as many pairs of muſcles.

Uſe. To approximate the attachments mutually.

Intercoſtalis Internus.

Origin. The internal part of the whole of the inferior edge of the coſtal cartilage, and of the rib, the ſpace between the angle and the vertebra excepted.

The courſe of the fibres is obliquely backwards, ſo that they croſs at angles, more or leſs acute, with thoſe of the former muſcle; a very thin layer er of a cellular ſubſtance is interpoſed. The internal ſurface is covered by the pleura.

Uſe. To co-operate with the former.

It thus appears, that an external and internal intercoſtal muſcle muſt be wounded in the *paracenteſis thoracis*, performed in any point of an interſtice between the cartilages and angles of the ribs.

Theſe muſcles, in conſequence of the diſpoſition deſcribed, greatly promote the accurate cure of the fractured rib, by maintaining the fragments in their proper place, ſo that little ſurgery in general is neceſſary.

Levatores Coſtarum.

There are twelve on each ſide.

Origin. The tranſverſe proceſſes of the laſt cervical and eleven ſuperior dorſal vertebræ.

Inſertion. The upper ſides of the correſponding ribs, near their tuberoſities.

Three or four of the inferior of theſe muſcles paſs over one rib entirely, and thus being longer, are named *longiores*, to diſtinguiſh them from the reſt, which have been called *breviores*.

Uſe. To pull the ribs upwards and outwards.

Sterno-coſtalis.

There are three, four, or five on each ſide.

Origin. The edge of the ſternum internally.

Inſertion. The upper edges of the adjoining cartilages.

Uſe. To depreſs the ribs.

The figure of theſe complexly has given occaſion to call the whole *triangularis*, as if one muſcle.

Serratus Poſticus Superior.

Origin. The ſpinous proceſſes of the two loweſt cervical and two higheſt dorſal vertebræ.

Inſertion. The external ſurface of the ſecond, third, fourth, and fifth ribs.

Uſe. To elevate the inſertion.

Serratus Poſticus Inferior.

Origin. The ſpinous proceſſes of the two loweſt dorſal and three higheſt lumbar vertebræ.

Inſertion. The external ſurface of the eighth, ninth, tenth, eleventh, and twelfth ribs.

Uſe. To depreſs the inſertion.

Scalenus Anticus.

Origin. The tranſverſe proceſſes of the fourth, fifth, and ſixth cervical vertebræ.

Inſertion. The firſt rib, near its cartilage.

Uſe. To raiſe the inſertion.

Scalenus Medius.

Origin. The tranſverſe proceſſes of all the cervical vertebræ.

Inſertion. The firſt rib behind the former muſcle.

Uſe. To raiſe the inſertion.

A triangular interſtice is formed between theſe ſcaleni, which tranſmits the ſubclavian artery and brachial nerves.

Scalenus Poſticus.

Origin. The tranſverſe proceſſes of the fifth and ſixth cervical vertebræ.

Inſertion. The ſecond rib near its tuberoſity.

Uſe. To raiſe the inſertion.

Diaphragma.

This broad and thin azygous muſcle is the partition between the cheſt and belly; its ſituation is very oblique, ſo that, while the anterior edge is fixed to the ſternum, the poſterior adheres to the lumbar vertebræ.

Origin. The ſternum and cartilaginous ends of the ſeventh, and of all the inferior ribs; The tranſverſe proceſſes of the ſecond lumbar vetebræ, (theſe portions have been named *crura*) and bodies of the inferior ones.

Inſertion. The inferior ſurface of the *pericardium*, to which the upper ſurface of the oval, or rather ſemilunar tendon, in the middle of this muſcle, extenſively adheres, ſo as to produce a very conſiderable convexity towards the cheſt, and a proportional hollow towards the belly, by which the latter is much enlarged.

Near the right ſide of this tendon is a *triangular hole*, which tranſmits the *vena cava aſcendens*.

A little below the tendon and oppoſite to the ſpine, is an *oval hole*, to give paſſage to the *œſophagus* or *gullet*, and *eighth pair* of nerves.

Almoſt immediately below this œſophageal hole, and cloſe to the ſpine, is another which may be called *aortic*, becauſe the aorta paſſes through it downwards, and is for a conſiderable ſpace cloſely inveſted by the muſcular fibres.

Through this aortic hole the *thoracic duct* and *vena azygos* aſcend.

The part of this muſcle which ariſes from the lumbar vertebræ, has been deſcribed as a diſtinct muſcle, under the name of *leſſer* and *inferior* muſcle, and *appendix* of the diaphragm, while the reſt has been ſtiled *ſuperior* and *greater*, a diſtinction that tends only to embarraſs the deſcription.

The upper ſurface of the diaphragm, the place of inſertion excepted, is covered by the inferior part of the two *pluræ* or lining membranes of the cheſt, while the under one is inveſted by the *peritonæum* or lining membrane of the belly, except where the *liver* adheres to it.

Uſe. To enlarge the cheſt laterally by the correſponding portions approaching to a plane between the origin and inſertion.

This action coincides with that of the intercoſtals, &c. gives the general expanſion of the cheſt and *inſpiration*, in which it would ſeem to be the moſt efficient muſcle.

When theſe muſcles, which may be called *reſpiratory*, ceaſe to act, the cheſt, as explained, is contracted, and hence *expiration.*

The action of the diaphragm coinciding with that of the abdominal muſcles, gives conſtriction of the contained organs, on which, in a chief degree, parturition, vomiting, and expulſion of the fæces depend.

Inflammation of this principal muſcle, (paraphreneſis) muſt be highly incommoding; it often excites hiccough.

The diaphragm has ſometimes been ruptured by ſtrong exertions.

It meets the knife in the paracenteſis thoracis immediately after the pleura is wounded, if too low a ſituation has been adopted.

It will now be perceived that the lungs, the diaphragm, the liver, the ſtomach, and the ſpleen, may be wounded at once by a ſmall ſword or the like, owing to the upward convexity of the middle part of the diaphragm, a circumſtance requiring great attention in the management of wounds in its neighbourhood.

12. MUSCLES ON THE ANTERIOR PART OF THE SPINE.

Longus Colli.

Origin. The bodies of the three uppermoſt dorſal, and the tranſverſe proceſſes of the four undermoſt cervical vertebræ.

Inſertion. The bodies of all the cervical vertebræ.

Uſe. To move the inſertion forwards and downwards.

Rectus Capitis Internus Major.

Origin. The points of the tranſverſe proceſſes of the third, fourth, fifth, and ſixth cervical vertebræ.

Inſertion. The cuneiform proceſs of the occipital bone.

Uſe. To draw the inſertion forwards and downwards.

Rectus Capitis Internus Minor.

Origin. The body of the firſt cervical vertebra.

Inſertion. The root of the condyloid proceſs of the occipital bone.

Uſe. To co-operate with the former muſcle.

Rectus Capitis lateralis.

Origin. The tranſverſe proceſs of the firſt vertebra.

Inſertion. The beginning of the cuneiform proceſs of the occipital bone laterally.

Uſe. To move the inſertion downwards.

Quadratus Lumborum.

Origin. The poſterior part of the ſpine of the os ilium.

Inſertion. The tranſverſe proceſſes of all the lumbar vertebræ, the head of the laſt rib, and the body of the laſt dorſal vertebra.

Uſe. To move the inſertion laterally.

Pſoas Parvus.

Origin. The bodies of the two upper lumbar vertebræ.

Inſertion. The os innominatum at the junction of the os pubis and os ilium.

This muſcle is not always to be found.

Uſe. To move the ſpine forwards.

13. MUSCLES ON THE POSTERIOR PART OF THE SPINE.

Splenius.

Origin. The ſpinous proceſſes of the five inferior cervical, and four ſuperior dorſal vertebræ.

Inſertion. The tranſverſe proceſſes of the five ſuperior cervical vertebræ, the poſterior part of the maſtoid proceſs and vicinity.

Uſe. To move the inſertion backwards and downwards.

Complexus.

Origin. The tranſverſe proceſſes of the four inferior cervical, and ſix ſuperior dorſal vertebræ, and ſpinous proceſs of the firſt dorſal one.

Inſertion. The tranſverſe line of the occipital bone.

Uſe. To move the inſertion laterally backwards.

Trachelo-maſtoidæus.

Origin. The tranſverſe proceſſes of the five undermoſt cervical, and three uppermoſt dorſal vertebræ.

Inſertion. The poſterior ſurface of the maſtoid proceſs.

Uſe. To co-operate with the former muſcle.

Spinalis Dorſi.

Origin. The ſpinous proceſſes of the two uppermoſt lumbar, and two loweſt dorſal vertebræ.

Inſertion. The ſpinous proceſſes of the nine uppermoſt dorſal vertebræ, the firſt excepted.

Uſe. To extend the ſpine.

Longiſſimus Dorſi.

Origin. The poſterior ſpine of the os ilium, the ſpinous proceſſes of the os ſacrum, and thoſe of the lumbar vertebræ, to the tranſverſe proceſſes nearly.

Inſertion. The lower edges of all the ribs near their tuberoſities, except the laſt, and the tranſverſe proceſſes of all the dorſal vertebræ.

Uſe. To extend the ſpine.

Sacro-lumbalis.

Origin. Common with the former muſcle.

Inſertion. All the ribs near their angles.

Uſe. To depreſs the ribs, and therefore ſeems to be properly a muſcle of the cheſt.

Semi-ſpinalis Dorſi.

Origin. The tranſverſe proceſſes of the eighth, ninth, and tenth dorſal vertebræ.

Inſertion. The ſpinous proceſſes of the ninth, tenth, eleventh, and twelfth dorſal, and firſt cervical vertebræ.

Uſe. To extend the ſpine laterally.

Multifidus Spinæ.

Origin. The poſterior part of the os ilium, the tranſverſe proceſſes of all the lumbar, dorſal, and cervical vertebræ, the three uppermoſt of theſe laſt excepted.

Inſertion. The tranſverſe proceſſes of all the true vertebræ, the firſt cervical excepted.

Uſe. To co-operate with the former muſcles.

Semi-ſpinalis Colli.

Origin. The tranſverſe proceſſes of the ſix uppermoſt cervical vertebræ.

Inſertion. The ſpinous proceſſes of all the cervical vertebræ, the firſt and laſt excepted.

Uſe. To move the neck obliquely backwards.

Tranſverſalis Colli.

Origin. The tranſeverſe proceſſes of the five uppermoſt dorſal vertebræ.

Inſertion. The tranſverſe proceſſes of all the cervical vertebræ, except the firſt and laſt.

Uſe. To co-operate with the former muſcle.

Rectus Capitis Poſticus Major.

Origin. The ſpinous proceſs of the ſecond cervical vertebra.

Inſertion. The occipital bone laterally.

Uſe. To move the inſertion backwards.

Rectus Capitis Poſticus Minor.

Origin. The middle of the hind part of the firſt cervical vertebra.

Inſertion. The occipital bone laterally.

Uſe. To co-operate with the former.

Obliquus

Obliquus Capitis Superior.

Origin. The tranſverſe proceſs of the firſt cervical vertebra.

Inſertion. The occipital bone laterally.

Uſe. To move the inſertion downwards.

Obliquus Capitis Inferior.

Origin. The ſpinous proceſs of the ſecond cervical vertebra.

Inſertion. The tranſverſe proceſs of the firſt cervical vertebra.

Uſe. To move the inſertion upwards.

Interſpinales Colli.
——— *Dorſi.*
——— *Lumborum.*
Intertranſverſales Colli.
———— *Dorſi.*
———— *Lumborum.*

Theſe are parcels of fibres that connect the ſpinous and tranſverſe proceſſes reſpectively, ſo as to firm and ſtrengthen the ſpine.

Coccygæus.

Origin. The ſpine of the iſchii before the ſacro-iſchiatic ligament.

Inſertion. The adjacent edge of the os coccygis and os ſacrum.

Uſe. To move the os coccygis forwards.

14. Muscles

14. MUSCLES OF THE INTESTINUM RECTUM.

Levator Ani.

Origin. The internal ſurface of the os pubis and os iſchii as far as its ſpine, and the membrane that covers the obturator internus and coccygæus muſcles.

The fibres converge in a downward and inward courſe.

Inſertion. The os coccygis, the extremity of the rectum, the neck of the bladder of urine, the proſtate gland, and part of the veſiculæ ſeminales.

Uſe. To ſupport and raiſe the rectum and incumbent parts.

This muſcle is wounded in the operation for fiſtula ani in general, and for the ſtone.

Sphincter Ani.

Origin. The extremity of the os coccygis.

The fibres ſtretch forwards like oval lines on each ſide of the anus, as do thoſe of the orbiculares palpebrarum and oris, about their reſpective openings.

Inſertion. The perinæal parts near the os pubis.

Uſe. To ſhut and ſupport the anus.

The prolapſus ani is likely to happen when this azygous muſcle is weakened. It is wounded in the operations above mentioned.

As it lies immediately under the integuments, it has been called *ſphincter cutaneus* and *externus.*

14. MUSCLES OF THE PENIS.

Erector Penis.

Origin. The tuberoſity and ramus of the os iſchii.

Inſertion. The adjoining corpus cavernoſum penis.

Uſe. To aſſiſt erection.

Accelerator Urinæ or *Ejaculator Seminis.*

Origin. The ſphincter ani and vicinity.

Inſertion. The middle of the inferior part of the bulb of the urethra, where it meets with the oppoſite one.

Uſe. To ſupport and ſqueeze the urethra and adjacent parts.

The inciſion in the lateral lithotomy is directed between this and the former muſcle, to the membranous part of the urethra.

Tranſverſalis Penis.

Origin. The cellular ſubſtance on the tuberoſity of the os iſchii.

Inſertion. The accelerator muſcle and ſphincter ani, near the bulb of the urethra.

There are ſometimes two on each ſide.

Uſe. To co-operate with the former muſcles.

This is always wounded in the lateral operation for the ſtone.

15. MUSCLES OF THE TESTICLES.

Cremaſter.

Origin. The obliquus internus abdominis, as mentioned above.

Inſertion. The ſurface of the tunica vaginalis teſtis.

Uſe. To ſupport the teſtis, and promote the motion of the ſemen occaſionally.

Dartos.

This is an azygous muſcular expanſion immediately within the integuments of the ſcrotum, with the cellular ſubſtance of which it is peculiarly intermixed and difficultly ſeparable. It is formed into two pouches, with a middle partition, called *ſeptum ſcroti*, fixed to the urethra from the bulb forwards. The lateral parts are attached to the cellular ſubſtance of the groins.

Uſe. To aſſiſt the cremaſter by corrugating the ſcrotum.

This muſcle is wounded in the palliative and radical operation for hydrocele teſtis.

16. MUSCLES OF THE CLITORIS AND VAGINA UTERI.

Erector Clitoridis.

This altogether reſembles the erector penis.

Sphincter Vaginæ.

Origin. The ſphincter ani.

In their courſe forwards the fibres paſs on each ſide of the inferior extremity of the vagina uteri.

Inſertion. The cellular parts near the arch of the pelvis.

Uſe. To ſupport and narrow the vagina uteri, hence ſometimes named *conſtrictor cunni.*

17. MUSCLES OF THE ARM.

Supra-ſpinatus.

Origin. The margin and ſurface of the cavity above the ſpine of the ſcapula.

The anterior extremity paſſes under the acromion.

Inſertion. The largeſt tuberoſity on the head of the os humeri near the bicipital groove.

Uſe. To raiſe the arm.

Infra-ſpinatus.

Origin. The margin and ſurface of the cavity below the ſpine of the ſcapula.

Inſertion. The largeſt tuberoſity on the head of the os humeri near the former muſcle.

Uſe. To aſſiſt the former.

A ſtrong membrane covers this and the ſupra ſpinatus.

Teres Minor.

Origin. The inferior coſta of the ſcapula near the inferior angle.

Inſertion. The largeſt tuberoſity on the head of the os humeri.

Uſe. To co-operate with the former muſcles.

Teres Major.

Origin. The inferior angle of the ſcapula.

Inſertion. The inner margin of the bicipital groove, along with the latiſſimus dorſi.

Uſe. To move the arm downwards and backwards.

Sub-ſcapularis.

Origin. The margin and ſurface of the ſcapula that reſpects the ribs, between which is interpoſed the ſerratus magnus.

The fibres are collected into bundles, and occupy the whole of the hollow of the ſcapula.

Inſertion. The ſmall or innermoſt tuberoſity of the os humeri.

Uſe. To move the inſertion towards the ſide.

The inſertions of all theſe muſcles are divided by the diſſecting knife, after the double inciſion, in amputation in the ſhoulder joint.

The tendons of the ſupra-ſpinatus, the infra-ſpinatus, and the ſub-ſcapularis, muſt ſuffer much alteration in the diſlocation of the os humeri,

Deltoides.

Origin. The poſterior end of the clavicle, the acromion proceſs, and ſpine of the ſcapula.

It conſiſts of converging bundles of fibres, that cover the outer part of the ſhoulder joint.

Inſertion. A ſcabrous ſurface near the middle of the os humeri externally, formerly mentioned.

Uſe. To move the arm upwards, backwards, and forwards.

Coraco-brachialis.

Origin. The Coracoid proceſs of the ſcapula.

Inſertion. The middle of [the os humeri internally.

Uſe. To move the arm upwards and forwards.

This muſcle is perforated about its middle by a nerve, on this account named *perforans* and *muſculo-cutaneus.*

18. MUSCLES OF THE FORE-ARM.

Biceps Flexor Cubiti.

Origin. The tendon of that head or part of this muſcle named *longus*, is fixed to the upper edge of the glenoid cavity of the ſcapula, after having paſſed along the bicipital groove and through the cavity of the joint.

The tendon of the other head, named *brevis*, is attached to the coracoid proceſs of the ſcapula.

The united heads form a large and long fleſhy belly, occupying the fore part of the arm.

Inſertion. The tuberoſity near the cervix of the radius as deſcribed formerly; after ſending off an aponeuroſis towards the internal edge of the fore-arm, which ſeems to produce the faſcia that inveſts the whole of it.

Uſe. To give flection and ſupination.

The tendon of inſertion of this muſcle can be felt in every inſtance, without diſſection; a circumſtance worthy to be remembered by the phlebotomiſt: Becauſe it certainly indicates the ſituation of the brachial artery and radial nerve, which always run near it on the inſide, covered by the aponeuroſis mentioned above.

Becauſe tendons are only obſcurely ſenſible, it it is doubtful if a wound or puncture of this aponeuroſis can be ſo formidable as has been imagined.

It is not likely that the tendon of the long head of this muſcle can obſtruct reduction of the luxated os humeri, as has been ſuppoſed; at any rate, ſuch oppoſition is much or altogether removed by flexion at the elbow.

Brachialis Internus.

Origin. The middle of the os humeri near the inſertion of the deltoid.

Inſertion. The root of the coronoid proceſs of the ulna, as ſpecified in the oſteology.

Uſe. To give flection.

Triceps Extenſor Cubiti.

Origin. The firſt head called *longus*, is fixed to the inferior coſta of the ſcapula near the glenoid cavity; the ſecond, named *brevis*, adheres to the hind part of the os humeri, near its head; the third, termed *brachialis externus*, is attached to the ſame bone, near the teres minor.

The common belly of the muſcle lies immediately above the olecranon.

Inſertion. The olecranon and vicinity.

Uſe. To give extenſion.

Anconæus.

Origin. The external condyle of the os humeri.

Inſertion. The poſterior ſurface of the ulna, a little below the elbow.

Uſe. To aſſiſt the former muſcle.

19. MUSCLES OF THE CARPUS.

Palmaris Longus.

Orign. The internal condyle of the os humeri.

Inſertion. The annular ligament of the wriſt (ligamentum carpi annulare) and palmar aponeuroſis.

Uſe. To give flexion of the wriſt joint, and ſtretch the aponeuroſis mentioned.

This is ſometimes not to be found.

Palmaris Brevis.

This is a very ſmall and ſhort muſcle.

Origin. The cellular ſubſtance near the edge of the palm, anſwering to the little finger.

Inſertion. The palmar aponeuroſis.
Uſe. To narrow the palm.

Flexor Carpi Radialis.

Origin. The internal condyle of the os humeri, and adjacent ſurface of the ulna.
Inſertion. The fore and upper part of the metacarpal bone of the fore finger.
Uſe. To give flexion as well directly as laterally.

Flexor Carpi Ulnaris.

Origin. The internal condyle of the os humeri, and the olecranon partly.
Inſertion. The os piſiforme and metacarpal bone of the little finger.
Uſe. To aſſiſt the former muſcle.

Extenſor Carpi Radialis Longior.

Origin. The os humeri, above the external condyle.
Inſertion. The fore part of the metacarpal bone of the fore finger.
Uſe. To give extenſion and lateral flexion.

Extenſor Carpi Radialis Brevior.

Origin. The external condyle of the os humeri, and adjacent part of the capſular ligament.
Inſertion. The metacarpal bone of the middle finger.
Uſe. To co-operate with the longior.

Extenſor Carpi Ulnaris.

Origin. The external condyle of the os humeri, and middle of the ulna.

Its tendon paſſes along a groove on the end of the ulna, near the ſtyloid proceſs.

Inſertion. The metacarpal bone of the little finger.

Supinator Radii Longus.

Origin. The os humeri, above the external condyle.

Inſertion. The inferior extremity of the radius on the ſide that reſpects the back of the thumb.

Uſe. To give ſupination.

Supinator Radii Brevis.

Origin. The external condyle of the os humeri, and upper part of the ulna.

Inſertion. The head of the radius, near the border of the biceps.

Uſe. To aſſiſt the former muſcle.

Pronator Radii Teres.

Origin. The internal condyle of the os humeri and coronoid proceſs of the ulna.

Inſertion. The middle of the outer edge of the radius.

Uſe. To give pronation.

Pronator Radii Quadratus.

Origin. The inner part of the ulna, at the wriſt.

Inſertion. The inner part of the radius, at the wriſt.

Uſe. To aſſiſt the former.

20. MUSCLES OF THE FINGERS.

Flexor Sublimis Perforatus.

Origin. The internal condyle of the os humeri; the coronoid proceſs of the ulna; and the tubercle and fore part of the radius.

This muſcle is ſituated in the middle of the fore arm longitudinally. It ſends down four tendons that paſs below the annular ligament.

Inſertion. The fore part of the bones of the ſecond phalanx of the finger bones, by the four tendons reſpectively, each of which is divided ſo as to produce a ſlit to tranſmit a tendon of the following muſcle.

Uſe. To give flexion.

Flexor Profundus Perforans.

Origin. The upper part of the ulna, and interoſſeous ligament.

This, like the former muſcle, produces four tendons.

Inſertion. The fore part of the third phalanx of the finger bones, by the four tendons reſpectively, ly, each being previouſly tranſmitted through a ſlit of thoſe of the former muſcle.

Theſe tendons are tied down in the hollows of the finger bones by ligaments commonly called *ſheaths*, a circumſtance on which their effect much depends.

Uſe. To aſſiſt the former.

In the ſheaths of the tendons *whitloe* or *paronychia* is often formed, which not unfrequently is communicated to the bones. It ſeems to be proper to have recourſe to inciſion of requiſite ſize, ſo as to evacuate the effuſed matter.

Lumbricales.

Theſe are four, placed in the interſtices of the tendons of the two laſt deſcribed muſcles, ſomewhat like worms, hence the name.

Origin. The tendons of the flexor profundus, a little below the wriſt.

Inſertion. The tendons of the interoſſeous muſcles, near the fingers.

Uſe. To aſſiſt the former.

Extenſor Digitorum Communis.

Origin. The external condyle of the os humeri.

Like the flexor ſublimis and profundus muſcles, this terminates in four tendons, that paſs under the external annular ligament, and then proceed along the metacarpal bones in a diverging manner, communicating by ſmall ends near the fingers.

Inſertion. The poſterior ſurfaces of all the finger bones.

Uſe. To extend all the fingers.

Indicator.

Origin. The poſterior and middle ſurface of the ulna.

The tendon goes under the annular ligament, along with thoſe of the exterior communis.

Inſertion. The poſterior ſurface of the fore finger bones.

Uſe. To aſſiſt in the extenſion of the fore finger.

Abductor Indicis.

Origin. The os trapezium and metacarpal bone of the thumb.

Inſertion. The firſt phalanx of the fore finger towards the thumb.

Uſe. To ſeparate the finger from the others.

Abductor Minimi Digiti.

Origin. The annular ligament and os piſiforme.

Inſertion. The firſt phalanx of the little finger laterally.

Uſe. To ſeparate the little finger from the others.

Adductor Minimi Digiti.

Origin. The annular ligament and os unciforme.

Inſertion. The metacarpal bone of the little finger laterally.

Uſe. To approximate the inſertion to the ring finger.

Flexor Parvus Minimi Digiti.

Origin. The annular ligament and os unciforme.

Inſertion. The firſt phalanx of the little finger, between the inſertions of the former muſcles.

Uſe. To give aſſiſtance in the flexion.

Interoſſei Externi.

Theſe are four, lying in the interſtices of the metacarpal bones, under the integuments of the back of the hand.

Origin. The roots of the metacarpal bones reſpectively.

Inſertion. The internal ſurface of the tendons of the extenſor communis, near the fingers.

Uſe. To aſſiſt in the extenſion of the fingers.

Interoſſei Interni.

Theſe are three, ſituated in the metacarpal interſtices on the ſide of the palm.

Origin. The roots of the metacarpal bones in the reſpective interſtices.

Inſertion. The poſterior ſurfaces of the firſt phalanx of the fore, ring, and little fingers reſpectively, along with the tendons of the extenſor communis.

Uſe. To promote the extenſion.

21. MUSCLES OF THE THUMB.

Flexor Longus Pollicis Manus.

Origin. The internal condyle of the os humeri and upper part of the radius.

Inſertion. The inner ſurface of the laſt phalanx.

Uſe. To bend.

Flexor Brevis Pollicis Manus.

Origin. The carpal bones near the root of the thumb.

The flexor longus paſſes through this muſcle.

Inſertion. The ſeſamoid bone and ſecond phalanx.

Uſe. To aſſiſt the former.

Opponens Pollicis Manus.

Origin. The ligamentum carpi annulare and os trapezium.

Inſertion. The anterior ſurface of the metacarpal bone of the thumb.

Uſe. To aſſiſt the former.

Extenſor Oſſis Metacarpi.

Origin. The external and middle part of the bones of the fore arm and interoſſeous ligament.

Inſertion. Os trapezium and adjoining ſurface of the metacarpal bone.

Uſe. To extend.

Extenſor Primi Internodii.

Origin. External part of the radius and interoſſeous ligament, near the former muſcle.
Inſertion. The under end externally of the firſt phalanx.
Uſe. To aſſiſt the former.

Extenſor Secundi Internodii.

Origin. The ulna near its lower end, and adjoining part of the annular ligament.
Inſertion. The laſt phalanx.
Uſe. To aſſiſt the two former.

Abductor Pollicis.

Origin. The annular ligament and os trapezium.
Inſertion. The firſt phalanx.
Uſe. To ſeparate the thumb from the fingers.

Adductor Pollicis.

Origin. The metacarpal bone of the middle finger.
Inſertion. The ſecond phalanx.
Uſe. To move the thumb towards the fingers.

22. MUSCLES OF THE THIGH.

The muſcles of the thigh and leg are cloſely inveſted with a tendinous membrane or faſcia, which is thickeſt in the fore part.

The cellular ſubſtance of the integuments adheres to the exterior ſurface of the faſcia, as does that in the interſtices of the muſcles to the interior one; and through its whole length it is much connected to the linea aſpera.

It ſeems to be proper in amputation, eſpecially in the thigh, to ſeparate the integuments that are to be preſerved from this faſcia; becauſe it is more eaſily done than to ſeparate this along with the integuments, while perhaps the doing ſo would not promote the healing of the wound.

Suppuration often happens within the faſcia, and, on account of the reſiſtance which this membrane gives to the outward tendency or burſting, the matter is extended miſchievouſly in the interſtices of the muſcles; a fact which indicates the propriety of oncotomy, or diſcharging the matter in due time by inciſion.

Tenſor Faſciæ, or *Vaginæ femoris.*

Origin. The anterior ſuperior ſpinous proceſs of the os ilium.

Inſertion. The faſcia a little below the trochanter major.

Uſe. To move the inſertion upwards.

Glutæus Maximus.

Origin. The poſterior part of the ſpine of the os ilium, the external ſurface of the os ſacrum laterally, and the ſacro-iſchiatic ligament.

The fibres converge in their downward courſe; thoſe of the poſterior edge bend ſomewhat behind the others, and produce the circular contour of the hip.

Inſertion. The linea aſpera near the trochanter major.

Mucous cellular membrane, in the form called *burſa mucoſa*, which much reſembles capſular ligament in appearance and uſe, is interpoſed betwixt this muſcle and the trochanter, evidently to prevent injury from friction, a device obſervable in many other places.

Uſe. To move the inſertion outwards and backwards.

Glutæus Medius.

Origin. The anterior ſuperior ſpinous proceſs of the os ilium, the ſpine of this bone its poſterior part excepted, and its dorſum.

Inſertion. The lateral and poſterior part of the trochanter major.

Uſe. To co-operate with the former, chiefly in an outward direction.

Glutæus Minimus.

Origin. The exterior ſurface of the os ilium, below the anterior ſuperior ſpinous proceſs.

Inſertion. The upper point of the trochanter major.

Uſe. To aſſiſt the former.

Pyriformis.

Origin. The anterior ſurface of the ſecond, third, and fourth pieces of the os ſacrum.

Its ſituation is nearly tranſverſe; its ſhape is expreſſed by its name.

Inſertion. The root of the trochanter major.

Uſe. To give rotation.

Gemini.

Origin. The ſpine and tuberoſity of the os iſchii, and ſacro-iſchiatic ligament.

This muſcle, near its origin, conſiſts of two parcels, hence the name; they are connected by a peculiar membrane, which covers the tendon of the obturator internus.

Inſertion. The root of the trochanter major.

Uſe. To co-operate with the former.

Quadratus Femoris.

Origin. The outſide of the tuberoſity of the os iſchii.

Inſertion. Between the trochanters.

Uſe. To co-operate with the former.

Pſoas Magnus.

This lies along the fore and lateral ſurface of the lumbar vertebræ and brim of the pelvis.

Origin. The bodies and tranſverſe proceſſes of the laſt dorſal and all the lumbar vertebræ.

The inferior part paſſes over the os innominatum, at the junction of the os pubis and os ilium, where a burſa mucoſa is interpoſed.

Inſertion. The trochanter minor and vicinity.

Iliacus Internus.

This occupies the foſſa iliaca, deſcribed in the oſteology.

Origin. The inner edge of the ſpine of the os ilium, and the ſurface between the ſpinous proceſſes to the acetabulum nearly.

This is inſeparably joined to the pſoas magnus, as it paſſes from the pelvis downwards, ſo that they may juſtly be regarded as a biceps.

Inſertion. The trochanter minor and vicinity.

Uſe. This and the former bend the trunk and the thigh reciprocally, according as the one is more fixed than the other.

Obturator Internus.

This lies in the thyroid hole, on the inſide of the obturator ligament.

Origin. The margin of the thyroid hole and the obturator ligament.

The fibres converge in a backward and downward direction, and ſend a round tendon over the pully ſurface, between the ſpine and tuberoſity of the os iſchii, which is covered by the gemini, as already mentioned.

Inſertion. The root of the trochanter major.

Uſe. To co-operate with the gemini.

Obturator Externus.

This lies in the thyroid hole, on the outſide of the obturator ligament.

Origin. The circumference of the thyroid hole, particularly the upper part.

Inſertion. The root of the trochanter major.

Uſe. To give outward rotation.

Pectinalis.

Origin. The os pubis, above the thyroid hole.

Inſertion. The upper part of the linea aſpera.

Uſe. To move the thigh inwards.

Triceps Adductor Femoris.

This is a very extenſive muſcle, conſiſting of three portions, a good deal diſtinct.

1. *Adductor Longus.*

Origin. The os pubis, near the pectinalis.
Inſertion. The linea aſpera, below its middle.

2. *Adductor Brevis.*

Origin. The os pubis, near the ſymphyſis.
Inſertion. The linea alba, above its middle.

3. *Adductor Magnus.*

Origin. The os pubis, near the former portion.

Inſertion. The whole of the anterior part of the linea alba nearly, and the internal condyle of the os femoris,to which a tendon is extended and fixed. Somewhat above a hole is left near the bone, for the tranſmiſſion of the femoral artery backwards.

Uſe. To co-operate with the pectinalis.

It is proper to remark, that the pſoas magnus, iliacus internus, obturotor internus, obturator externus, pectinalis, and triceps adductor femoris, ought not to be diſſected till the following long muſcles of the leg have been inveſtigated and removed.

It is obvious, that, when amputation is to be performed in the hip-joint, the inſertions of the muſcles near the head of the os femoris muſt be deſtroyed by the ſmall knife, after the uſual inciſions have been made by the large one, nearly as was obſerved regarding this operation on the ſhoulder-joint.

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23. Muscles of the Leg.

The following are ſituated on the fore part of the thigh.

Sartorius.

This is the longeſt muſcle.

Origin. The anterior ſuperior ſpinous proceſs of the os ilium.

The courſe is ſomewhat ſpiral.

Inſertion. Near the interior part of the ſcabrous ſurface, on the fore part of the head of the tibia.

Uſe. To move the leg obliquely inwards.

Rectus Femoris.

Origin. The inferior anterior ſpinous proceſs of the os ilium and vicinity.

The fleſhy part of this muſcle is pinnated, and is placed in the middle of the fore part of the thigh.

Inſertion. The upper part of the rotula.

An expanſion from the tendon of this muſcle covers the anterior ſurface of the rotula, as mentioned in the oſteology. Collected at the under edge of it, a thick tendon, commonly called *ligament of the patella*, is produced, which is inſerted into the tibia, above the ſcabrous ſurface.

Uſe. To extend the leg.

Vaſtus

Vaſtus Externus.

Origin. The root of the trochanter major, and linea aſpera nearly through its whole length.

Inſertion. The upper and lateral part of the patella.

Uſe. To aſſiſt the former muſcle.

Vaſtus Internus.

Origin. The root of the trochanter minor forwards, and greateſt part of the linea alba inwards.

Inſertion. The upper and lateral part of the patella.

Uſe. To aſſiſt the two former.

Cruraeus.

Origin. The fore part of the os femoris, between the trochanters, and downwards immediately behind the rectus.

Inſertion. The middle of the upper part of the patella.

Uſe. To aſſiſt the three former.

May not theſe four muſcles, as they are more or leſs mutually connected by their bodies or tendons, be conſidered as a quadriceps extenſor tibiæ?

Gracilis.

This and the two following muſcles are placed on the inſide of the thigh, ſomewhat backwards.

Origin. Near the ſymphyſis pubis.

Inſertion. The ſide of the head of the tibia, behind and near the tendon of the ſartorius.

Uſe. To move the leg inwards.

Semitendinoſus.

Origin. The poſterior part of the tuberoſity of the os iſchii.

Inſertion. The head of the tibia behind and below the tendon of the former.

Uſe. To move the leg inwards and backwards.

Semimembranoſus.

Origin. The poſterior part of the tuberoſity of the os iſchii, above the former muſcle.

Inſertion. The head of the tibia, behind the former.

Uſe. To move the leg backwards.

The tendons of the two muſcles laſt deſcribed for the inner border or ala of the ham; therefore commonly called *inner ham-ſtring.*

Biceps Flexor Cruris.

This muſcle is ſituated on the outſide of the thigh, ſomewhat backwards.

Origin. The firſt head belonging to that part of the muſcle called *longus*, is attached to the tuberoſity of the os iſchii, in common with the tendon of the ſemitendinoſus. The ſecond or ſuperior attachment of that part called *brevis*, adheres to the linea aſpera.

Theſe portions are conjoined above the external condyle.

Inſertion. The head of the fibula.

Uſe. To move the leg backwards.

The tendon of this muſcle is the outer ala or border of the ham, or *outer ham-ſtring*.

It is now obvious, that the muſcles extended along the os femoris behind have much leſs adheſion to it than thoſe placed before. This occaſions more retraction of the former than the latter, when cut horizontally by the amputating knife. Hence the propriety of a due obliquity of inciſion, to preſerve a level ſurface, in amputation in the thigh.

Poplitæus.

This ſhort muſcle covers the back part of the knee-joint, and reſembles the anconæus.

Origin. The hind part of the external condyle of the os femoris.

Inſertion. The inner angle of the tibia.

Uſe. To aſſiſt the bending muſcles, and to give rotation of the leg.

24. MUSCLES OF THE TARSUS.

Gaſtrocnemius Externus, or *Gemellus.*

The belly of this muſcle is the principal part of the *calf*, commonly called the *brawn* of the leg.

Origin. The poſterior ſurface of the condyles of the os femoris. Hence there is a void left between it and the condyles, for the paſſage of nerves and veſſels.

Inſertion. The poſterior and upper joint of the os calcis.

Uſe. To extend the foot.

Salæus.

Salæus, or *Gaſtrocnemius Internus.*

This muſcle lies immediately before the one laſt deſcribed.

Origin The head of the fibula and adjacent ſurface of the tibia, ſo that a void, correſponding with that above mentioned, and for the ſame purpoſe, is produced.

Its belly extends conſiderably lower than that of the former one; their tendons are inſeparably conjoined, under the name of *tendo Achillis.*

Inſertion The os calcis, along with the former muſcle.

Uſe. To extend the foot.

Plantaris.

This muſcle has a ſmaller belly, compared with the great length of its tendon, than any other.

Origin. The upper and back part of the external condyle of the os femoris.

The tendon paſſes inwards, between the two laſt deſcribed muſcles, and runs down on the inſide of the tendo Achillis.

Inſertion. The inſide of the os calcis, below the tendo Achillis.

Uſe. To co-operate with the extenſors.

It is ſometimes wanting.

Some obſervations make it probable, that this tendon of the plantaris is liable to be ruptured independently of the others, and that it gives tedious lameneſs.

A rupture or fracture of the tendo Achillis is not unfrequent. It neceſſarily gives inability of extending the foot, of ſtanding, &c. It is eaſily diſcovered, on account of the ſuperficial ſituation of the tendon. The extended poſture of the foot and flexion of the knee obviouſly favour the cure.

Tibialis Anticus.

Origin. The tibia, near where the fibula is joined to it.

It has fibres connected with the tibia and interoſſeous ligament, in its way down to the ligamentum tarſi annulare; behind which it is tranſmitted.

Inſertion. The os cuneiforme internum, and adjoining metacarpal bone of the great toe.

Uſe. To give direct and lateral flexion.

Tibialis Poſticus.

Origin. The fore part of the ulna, near its joining with the fibula, through a deficiency in the upper part of the interoſſeous ligament; the hind part of the tibia, and interoſſeous ligament for ſome way downwards.

The tendon of this muſcle is paſſed under the ligamentum tarſi annulare, in a groove behind the inner ankle.

Inſertion. The os cuboides chiefly.

Uſe. To aſſiſt the former.

Peronæus Longus.

Origin. The anterior ſurface of a conſiderable ſhare of the fibula.

The tendon of this muſcle is paſſed in a groove of the fibula, or outer ankle, to the tarſus.

Inſertion. The metatarſal bone of the great toe chiefly.

Uſe. To give direct and lateral flexion.

Peronæus Brevis.

Origin. The anterior ſurface of the fibula about its middle.

The tendon of this muſcle is tranſmitted to the tarſus along the ſame groove with that of the former.

Inſertion. The root of the metatarſal bone of the little toe.

Uſe. To co-operate with the former.

16. MUSCLES OF THE TOES.

Extenſor Longus digitorum Pedis.

Origin. The heads of the tibia and fibula, and a conſiderable ſhare of the anterior angle of this laſt bone.

This muſcle, like that of the fingers, ſends four tendons under the ligamentum annulare, which proceed divergingly along the upper part of the foot.

Inſertion. The back or upper part of all the phalanges of the four ſmall toes.

Uſe. To extend.

There is inſeperably connected with this muſcle one called *peronæus tertius*, which ſends its tendon to the metatarſal bone of the little toe: Otherwiſe it does not belong to the toes.

Extenſor Bervis Digitorum Pedis.

Origin. The fore and upper part of the os calcis.

This muſcle ſends off four tendons that proceed like thoſe of the former muſcle (with which they croſs obliquely) towards the toes.

Inſertion. The back part of the three ſmall toes along with the former muſcle, and of the great toe.

Uſe. To aſſiſt the former.

Flexor Brevis Digitorum Pedis, or *Sublimis Perforatus.*

Origin. The inferior and poſterior part of the os calcis.

This muſcle produces four tendons with ſlits, like thoſe of the correſponding muſcle of the fingers.

Inſertion The ſecond phalanx of the four ſmall toes.

Uſe. To give flexion.

Flexor Longus Digitorum Pedis, or *Profundus Perforans.*

Origin. Two lines on the back part of the tibia, incloſing the tibialis poſticus partly.

The tendon is bound down by annular ligaments, and proceeds behind the inner ankle to the hollow on the inſide of the os calcis to the ſole, where it is divided into four, that paſs through the ſlits in the tendons of the former muſcle.

Inſertion. The laſt phalanx of the ſmall toe.

Uſe. To aſſiſt the former.

Flexor Digitorum Acceſſorius, or *Maſſa Carnea Jacobi Sylvii.*

Origin. The hollow on the inſide of the os calcis and vicinity.

Inſertion. The tendon of the flexor longus before it is divided, as explained.

Uſe. To aſſiſt the two former.

Lumbricales Pedis.

Theſe much reſemble the correſponding muſcles of the fingers.

Origin. The tendons of the flexor longus digitorum.

Inſertion. The expanded tendons of the extenſor muſcles at the upper part of the toes.

Uſe. To give lateral flexion chiefly,

Interoſſei Pedis Externi.

Theſe are four in number.

Origin. The roots of the metatarſal bones and vicinity.

Inſertion. The tendinous expanſion on the backs of the toes, the little one excepted.

Uſe. To aſſiſt the extenſors, and give ſome degree of lateral motion.

Interoſſei Interni.

Theſe are three in number.

Origin. The under ſurface of the roots of the metarſal bones of the ſmall toes chiefly.

Inſertion. The tendinous expanſion on the backs of the ſmall toes.

Uſe. To co-operate with the former.

Abductor Minimi Digiti.

Origin. The os calcis below, and externally as to that of the extenſor digitorum brevis.

Inſertion. The root of the firſt bone of the little toe.

Uſe. To give abduction.

Flexor Brevis Minimi Digiti.

Origin. The under part of the os cuboides principally.

Inſertion. The metatarſal and firſt bone of the little toe.

Uſe. To give flexion.

Tranſverſalis Pedis.

Origin. The fore end of the metatarſal bone of the great toe below.

Inſertion. The correſponding end of the metatarſal bone of the little toe.

Uſe. To narrow the ſole.

17. MUSCLES OF THE GREAT TOE.

Extenſor Proprius Pollicis Pedis.

Origin. The anterior ſurface of the fibula.

Inſertion. The poſterior ſurface of the bones of the great toe.

Uſe. To extend.

Flexor Longus Pollicis Pedis.

Origin. The poſterior ſurface of the fibula. The tendon of this muſcle paſſes within an annular ligament behind the inner ankle.

Inſertion. The laſt bone of the great toe.

Uſe. To bend.

Flexor Brevis Pollicis Pedis.

Origin. The under and fore part of the os calcis and vicinity.

Inſertion. The ſeſamoid bone and root of the firſt one of the great toe.

Uſe. To aſſiſt the former.

Abductor Pollicis Pedis.

Origin. The under and lateral part of the os calcis.

Inſertion. The ſeſamoid bone and root of the firſt one of the great toe.

Uſe. To give abduction.

Adductor Pollicis Pedis.

Origin. The os calcis near that of the maſſa carnea and vicinity.

Inſertion. The ſeſamoid bone and end of the metatarſal bone of the great toe.

Uſe. To give adduction.

ANGIOLOGY.

ANGIOLOGY, or a deſcription of the blood-veſſels, may properly begin with the arteries, and then proceed to the veins.

It has been remarked, that the heart is the center of the vaſcular ſyſtem in general, and conſequently of the arteries.

The Heart.

This is a conical hollow muſcle, lying in the bottom and fore part of the cheſt, included in a bag called *pericardium*, immediately above the tendon of the diaphragm.

The baſe of this organ is turned obliquely to the right, and its point proportionally to the left, ſo as nearly to coincide with the ſixth rib; where, accordingly, it is eaſily felt to beat or palpitate.

The external ſurface of the body and point of the heart is ſmooth and uniform, while that of the baſe is conſiderably different; but both are covered with a delicate poliſhed or gliſtening membrane, through which the cellular ſubſtance and veſſels are apparent.

There are four cavities in the heart; two in its body called *ventricles*, and two in its baſe named *auricles*.

The ventricles, and conſequently the body of the heart, may be conſidered as *arterial*, becauſe each is continued in an arterial trunk.

The ventricles are ſeparated from one another by a *ſeptum* or *partition*, formed by the muſcular fibres, variouſly intwined, ſomewhat like that of the dartos.

The one ventricle is called *right*, or rather *anterior*; and the other *left*, or *poſterior*, from ſituation: The firſt is generally the largeſt, while the muſcular ſubſtance of it is thineſt.

The ventricular ſurface is *reticular* or *meſhy*, the fibres being collected, as it were, into little muſcles, (columnæ carneæ) which croſs one another intricately and variouſly; and the whole is lined by a very fine membrane.

The right ventricle, from its baſe, ſends out a large artery, named *pulmonary*, becauſe it is entirely diſtributed in the lungs, (pulmones): And the left produces one equally capacious, but more denſe in its ſubſtance, called *aorta*, that is beſtowed on all the other parts; ſo that theſe two arteries, (which ſeem to be continuations of the ventricles) and their ramifications, conſtitute the whole of the arterial ſyſtem: Their terminations are called *exterme arteries*.

The auricles are two bags with a common partition (ſeptum) placed on the baſe of the body of the heart and ventricles.

Each auricle has a proceſs, which externally reſembles ſomewhat a dog's *ear*, hence the name of the whole; the right one is the moſt remarkable.

The auricular cavities are conſiderable, but leſs than the ventricles, and their ſubſtance much thinner, exhibits leſs of the meſhy ſtructure, particularly that of the left one: Both are lined with the continuations of the membranes of the ventricles reſpectively.

The auricles ſeem to be expanſions of various trunks; the right of two, called *venæ cavæ ſuperior* and *inferior*, or *deſcendens* and *aſcendens*; the left of four, named *pulmonary*, two on each ſide, becauſe they come from the lungs.

Thus the auricles may be conſidered as the terminations of ſix trunks of veins, and therefore the *venous* part of the heart.

Before birth, there is a large hole of communication in the ſeptum of the auricles, provided with a valve, called *foramen ovale*.

The auricles open into the ventricles reſpectively, by holes, therefore named *auricular orifices of the ventricles*, which are ſurrounded with flaps or doublings of the lining membranes, inclining downwards, with points attached to ſome of the columnæ carneæ of the ventricles, termed *valves*.

The valves in the right orifice are called *triglochine* or *tricuſpid*; and in the left one, *mitral*, from ſhape: There are generally three of the former, and two of the latter; which are ſo ſized and diſpoſed, as occaſionally to block up more or leſs the reſpective openings, ſo as to prevent regurgitation of the blood from the ventricles.

The communications of the arteries and ventricles may properly be termed *arterial orifices of the ventricles*; each of them is provided with three valves, called *ſemilunar*, turned towards the cavities of the arteries, formed and diſpoſed ſo as to prevent regreſs of the blood from the arteries.

The muſcular fibres of the ventricles ſeem to run in various directions, but chiefly ſo as to act from the point; and thoſe of the auricles in an oppoſite courſe.

The Pericardium.

This membrane of conſiderable thickneſs, contains not only the heart, but a pretty large ſhare of the trunks of the great veſſels connected with it, ſo as to reach nearly as high as the upper part of the ſternum.

The internal ſurface gliſtening like the coat of the heart, of which it is perhaps a continuation, forms a perfect cyſt, conſtantly moiſtened and lubricated with a water-like fluid, named *lymph:* A morbid accumulation of which is *dropſy of the pericardium*, and for the moſt part a fatal affection.

The external ſurface is chiefly covered with the pleuræ, which include it between them: A ſmall ſhare of it, however, touches the under part of the ſternum, with the intervention of ſome cellular ſubſtance, ſo as to render it practicable to open it through a trepaned hole of this bone, without wounding the pleuræ. May this be done to diſcharge dropſy there?

The tendon of the diaphragm is attached to the under and lateral part of the pericardium, as mentioned in the myology; by which it is prevented effectually from moving downwards during inſpiration.

It will now be underſtood that a rupture, or deſtruction of the ſeptum, or ſubſtance of the ventricles and auricles, is fatal; but that the blood effuſed will be confined by the pericardium.

Pulmonary Artery.

The trunk of this great veſſel lies before and a little to the left of the aorta, croſſing over its root within the pericardium.

Immediately beyond the pericardium it curves backwards conſiderably to the ſpine, and is divided into two branches, which are ſuddenly ſubdivided and diſperſed through the lobes of the lungs, as will be mentioned in the ſplanchnology.

Before birth a branch of communication goes off from this artery to the adjacent aorta, above the pericardium, called *ductus arterioſus*, by which a ſhare of the blood contained in it is tranſmitted without paſſing to the lungs. When reſpiration is eſtabliſhed this becomes a ligament.

Aorta.

This principal artery, after croſſing with, and emerging from behind the pulmonary one, runs almoſt directly upwards: Immediately beyond the pericardium, it make a ſudden flexion backwards, and a little to the left, ſo as ſoon to reach the left ſides of the bodies of the dorſal vertebræ: This is called *curvature* and *arch* of the aorta; the top of it is often equal with, and even a little beyond that of the ſternum: A circumſtance that ſuggeſts an important caution in making the longitudinal inciſion in bronchotomy: Indeed the edge of the knife ought, as much as poſſible, to be turned from it, or upwards, or guided by the finger of the left hand, ſo as to protect or repreſs the artery.

Within this arch of the aorta, or between its poſterior part and the baſe of the heart, is included the right branch of the pulmonary artery on its way to the right lobes of the lungs.

After the aorta has reached the left part of the ſpine, as mentioned, it is continued downwards, paſſing through its proper hole in the diaphragm, deſcribed in the myology, till it arrive at the laſt lumbar vertebra, where its trunk is ſaid to end, being divided into the right and left *iliac arteries.*

From the ventricle to the upper part of its arch, this artery, in alluſion to the courſe of the blood, is called *aorta aſcendens*, and from this downwards, *aorta deſcendens.*

The aorta, from point to point, in all its courſe, ſends off the following principal branches.

Coronary Arteries.

The *arteriæ coronariæ* are two in number, right and left; they go off from the aorta without, but near to the ſemilunar valves, mentioned above.

The right one paſſes forwards between the right auricle and ventricle, to the anterior and lateral ſurface of the heart, and is ramified and diſtributed to the adjacent parts.

The left one is a little higher than the right. It is tranſmitted between the left auricle and pulmonary artery, to the left portion of the head, its branches running downwards, and anaſtomoſing with thoſe of the other.

Subclavian Arteries.

From the convexity of the aortic arch ariſe three large branches, that bend more or leſs upwards.

The ſirſt, which is largeſt, loweſt, foremoſt, and ſomewhat to the right, is a trunk (*arteria innominata*) that is ſoon divided into two; the undermoſt is *right ſubclavian*, the other is *right carotid*.

The ſecond branch is the *left carotid;* it originates from a middle point.

The *left ſubclavian* (the third branch) ariſes immediately from the arch of the aorta to the left of, and ſomewhat behind the others.

The arteria innominata, or common trunk of the right ſubclavian and carotid, paſſes upwards, and to the right before the trachea between the top of the ſternum and adjoining end of the clavicle, ſo as to be within reach of the knife in bronchotomy, eſpecially if the longitudinal inciſion be carried low and unduely to the right.

The ſubclavian arteries (arteriæ ſubclaviæ) take a lateral direction, or that of the clavicles, behind and ſomewhat under which they lie: They terminate immediately between the ſcaleni muſcles, or above the firſt ribs, where the axillary ones begin.

The terminations of the ſubclavians can be felt pulſating behind the clavicles, where a uſeful compreſſion may be made by the fingers or tournequet of proper form, againſt the firſt ribs during amputation in the ſhoulder joints, or in caſe of wound in the axillary arteries to prevent hæmorrhage.

Each ſubclavian artery gives off the following:

1. Internal mammary,
2. Vertebral,
3. Inferior thyroid,
4. Cervical,
5. Superior intercoſtal.

Internal

Internal Mammary Artery.

This branch (*arteria mammaria interna*) is emitted from the ſubclavian, near the edge of the ſcalenus muſcle. It inclines forewards on the outſide of the correſponding pleura to the coſtal cartilages near the edge of the ſternum, till it reaches the low end of this bone, where it touches the rectus abdominis muſcle, and anaſtomoſes with the branches of the epigaſtric artery.

In all this courſe lateral branches go plentifully off to the adjacent parts, particularly to the mammary glands acroſs the intercoſtal and pectoral muſcles: Theſe accordingly occaſion briſk hæmorrhage in neighbouring wounds, eſpecially in amputation of the mammæ.

Vertebral Artery.

The *arteria vertebralis* ſprings from the poſterior ſurface of the ſubclavian, and tends to the vertebral canal in the tranſverſe proceſſes of the cervical vertebræ, at the upper part of which it is reflected backwards and inwards; then it proceeds upwards and forewards, thus reaching the cuneiform proceſs of the occipital bone to anaſtomoſe with its fellow, under the name of *baſilar artery*, which will be deſcribed along with the brain in the neurology.

Small lateral branches are emitted from this artery, in its courſe through the vertebral canal.

It was already remarked, that this protected vertebral artery is intended to inſure a ſupply of blood to the brain, although the carotid ones be obſtructed; and that the flexions are calculated to diminiſh the rapidity and impetus of the blood, otherwiſe too great.

Inferior Thyroid Artery.

The *arteria thyroidæa inferior* derives its origin from the ſubclavian near the internal mammary; after furniſhing branches to the adjacent parts, its trunk, in a ſerpentine courſe, arrives at the thyroid gland, as its name imports, in which it is chiefly diſperſed.

The briſk hæmorrhage following the longitudinal inciſion in bronchotomy, is principally from the wounded branches of this artery.

Cervical Artery.

The *arteria cervicalis* riſes commonly from the ſubclavian near the inferior thyroid. It runs upwards before the tranſverſe proceſſes of the cervical vertebræ, giving branches to the adjacent muſcles, and even to the ſpinal marrow.

A branch, named *ſuperficial cervical*, often goes off from the ſubclavian, and runs to the muſcles on the ſcapula and vicinity.

Superior intercoſtal artery.

The *arteria intercoſtalis ſuperior* ſprings from the poſterior and inferior ſide of the ſubclavian, and tends to the two ſuperior intercoſtal ſpaces chiefly, and ſupplies the *intercoſtal* and adjacent muſcles.

Carotid Arteries.

Theſe *carotides communes* ariſe from the ſides of the ſubclavians in the way deſcribed; they proceed upwards along the ſides of the trachea in a courſe ſomewhat divergent, and ſo ſuperficial that their pulſation is felt and often ſeen.

Theſe large trunks, called *common*, and on this account *primitive*, are placed ſomewhat more forward than the internal, or indeed than the external jugular veins, a circumſtance to be particularly marked by the Surgeon: When he performs phlebotomy in the neck, he ought to turn the point of the lancet backwards, eſpecially in the young ſubject; by this means he avoids the poſſibility of wounding the adjacent one. In making the tranſverſe inciſion in bronchotomy, their proximity to the trachea alſo ſuggeſts caution.

Oppoſite to the upper part of the larynx, each is ſubdivided into two branches, called *external* and *internal*, below which no remarkable branches are ſent off.

External Carotid.

This artery is called *external*, becauſe it is beſtowed on parts without the ſkull; for, in truth, it is otherwiſe more internal than the one ſo called.

The external carotid aſcends from the upper margin of the thyroid cartilage, behind the angle, towards the condyle of the lower jaw, where its trunk is ſaid to end. The principal arteries derived from it, are,

1. Superior thyroid,
2. Lingual or ranine,
3. Inferior pharyngæal,
4. Facial or labial,

5. Occipital,
6. Poſterior auricular,
7. Internal maxillary,
8. Temporal.

Superior Thyroid Artery.

The *arteria thyroidæa ſuperior* is called ſuperior, to diſtinguiſh it from the inferior, derived from the ſubclavian to the thyroid gland: Its root is very near the beginning of the external carotid; it deſcends to the upper part of the gland in a ſerpentine or waved progreſs, which by the bye is a circumſtance common to all arteries, as well as veins that are occaſionally much extended, otherwiſe they would be liable to be deſtroyed.

In its courſe it gives branches to the adjacent parts, and in the thyroid gland anaſtomoſes with the inferior thyroid.

Lingual Artery.

The *arteria lingualis* or *ſublingualis* ariſes from the external carotid, between the former and facial ones: After a winding courſe, in which it gives off branches, it arrives at the under part of the tongue, where the branch that runs near the frænulum of the tongue is ſtrictly called *ranine*, and may be wounded by an uncautious performance of the operation for tongue-tying.

Inferior Pharyngæal Artery.

The *arteria pharyngæa inferior* ariſes from the back part of the external carotid, oppoſite to the

lingual

lingual artery, and runs towards the lateral part of the larynx, in which and the neighbouring parts it is loſt.

Facial Artery.

The *arteria facialis* or *maxillaris externa* is about the ſize of a crow's quill. It ſprings from the carotid below the lingual one. Its courſe is winding. It is covered by the tendon of the digaſtricus, on its way to the maxillary gland, through a fiſſure of which it is tranſmitted, and bends outwards to the baſe of the jaw, where it can be felt pulſating, and conſequently may be compreſſed occaſionally.

At this point, which correſponds to the anterior and inferior part of the maſſeter, the trunk is divided into two branches; the loweſt runs forwards along the jaw to the chin, therefore named *mental*, (arteria mentalis); the other, which is ſtrictly *labial*, called alſo *coronary of the mouth*, ſends a branch along each of the lips, which anaſtomoſe with thoſe of the other ſide, and thus form a complete line about the mouth.

During the whole of this courſe many ſubordinate branches are emitted from this artery to the adjacent parts.

This artery is in the way of the extirpation of the maxillary gland, or lymphatic ones connected with it, which are often tainted from the cancerous lip, and require to be removed along with it.

The labial part of it is neceſſarily divided in the operation of the hare-lip, and of the cancerous mouth, hence two oppoſite ſtreams of blood that may be partly ſuppreſſed by proper compreſſion on the artery over the baſe of the jaw: Afterwards the hæmorrhage is permanently ſtayed by ſecure approximation of the edges of the wound by future or bandage.

The trunk that gives off the ſuperior labial continues to mount by the ala of the noſe, and is there *naſal*, to the angle of the eye-lids, and is called *angular*: And finally anaſtomoſes with the temporal and ophthalmic arteries.

Occipital Artery.

The *arteria occipitalis* is of conſiderable ſize. It ſprings from the hind part of the carotid, almoſt oppoſite to the lingual branch. It goes backwards on the outſide of the internal jugular vein, and below the maſtoid proceſs, and paſſes through the upper extremity of the complexus, and runs betwixt it and the ſplenius, and is afterwards loſt on the occipital parts, having anaſtomoſed with the temporal artery, and reached the dura mater.

This artery is often divided by the Surgeon, in the management of fractured ſkull; the hæmorrhage is ſeldom ſo great as to require particular attention.

Poſterior Auricular Artery.

The *arteria auricularis poſterior* ſprings commonly from the carotid, behind the parotid, near the occipital artery, and ſometimes from this laſt. It runs behind the ear, giving branches on all ſides, ſome of which reach the auditory cavities.

Internal Maxillary Artery.

The *arteria maxillaris interna* ariſes from the fore part of the carotid, conſiderably above the angle of the jaw. It bends forwards between the jaw and pterygodæus externus, and then upwards, and is loſt in ramifications to the deep-ſeated adjacent parts of the face chiefly.

In its courſe, a branch is ſent to the dura mater, and gives the impreſſions mentioned on the internal ſurface of the parietal bone; ſometimes it has complete canals, for its reception, as remarked in the oſteology.

This branch, called *arteria meningæa*, when lodged in a deep furrow or groove, and torn by the trepan, neceſſarily gives hæmorrhage difficult to be ſuppreſſed, but which the ingenious Surgeon will overcome by ſtyptics or compreſſion.

Temporal Artery.

The *arteria temporalis* is, as it were, the continuation of the external carotid artery, which runs up behind the maxillary joint, and within the parotid gland: Above this laſt it becomes ſuperficial, ſo that its pulſation can be felt, and gives off two branches, called *ſuperficial temporal arteries*, which are ſpread on the temples and ſide of the forehead, immediately under the integuments, in which there are furrows to receive them partly. The one that runs to the crown is called *poſterior*, and anaſtomoſes with the occipital artery; the other extends to the forehead betwixt the hairy ſcalp and the orbit, under the name of *anterior* and *frontal*, and anaſtomoſes with the facial.

The pulſations of the frontal branch are not only readily felt, but often viſible. It is therefore choſen chiefly for *arteriotomy*, which may be performed by the ordinary lancet; the hæmorrhage is vanquiſhed by ſlight compreſſion, and often without any.

The poſterior branch is frequently cut in the trepaning operation: If this be at a low point, the hæmorrhage may require the uſe of the needle. I have frequently experienced this.

The branch called *profound temporal* ſinks between the temporal muſcle and the ſkull.

The extirpation of the parotid gland, or others near it, requires obviouſly much caution, on ac- of the proximity of the temporal artery. In caſe of wounding it, and not being able to ſuppreſs the bleeding by the ordinary means, is it adviſable to tie the carotis communis?

Internal Carotids.

The *carotides internæ* or *arteriæ cerebrales* are each larger than a gooſe quill. They go off from the back parts of the common carotids, and bend towards their proper holes in the temporal bones, making the turns in their entering the cavity of the ſkull deſcribed in the oſteology.

The remaining deſcription of theſe arteries properly accompanies that of the brain in the neurology.

The aorta deſcendens has the following ramifications:

1. Bronchial,
2. Œſophagæal,
3. Poſterior mediaſtinal,

4. Inferior intercoſtals,
5. Inferior phrenic,
6. Cœliac,
7. Superior meſenteric,
8. Capſular,
9. Renal,
10. Spermatic,
11. Inferior meſenteric,
12. Lumbar,
13. Anterior Sacral.

Bronchial Arteries.

The *arteriæ bronchiales* are ſmall. They ſpring from the aorta behind the lungs, in one or two ſmall branches, and tend to the bronchial part of the lungs.

Oeſophageal Arteries.

The *arteriæ œſophageæ*, three or four in number, are ſmall, going off from the anterior part of the the aorta below the bronchial arteries. They reach the œſophagus, on which they are principally ſpread.

Poſterior Mediaſtinal Arteries.

Theſe *arteriæ mdiaſtini poſteriores* are very ſmall, and ſupply the poſterior part of the mediaſtinum.

Inferior Intercoſtal Arteries.

The number of the *arteriæ intercoſtales inferiores* is about nine on each ſide. They ariſe from the poſterior and lateral part of the aorta. Each is uſually divided into two, the *dorſal* and *intercoſtal;* the firſt goes to the ſpinal marrow, and the laſt to the intercoſtal ſpace running in its proper groove.

Inferior Phrenic Arteries.

The *arteriæ phrenicæ*, or *diaphragmaticæ inferiores*, are beautifully ramified on the inferior ſurface of the diaphragm. They ſpring from the aorta, as it paſſes the diaphragm, ſometimes in one, ſometimes in two trunks, or from the following artery, which is very near.

Cœliac Artery.

The *arteria cœliaca* is azygous. It ariſes from the aorta, between the proceſs of the liver called *lobulus Spigellii*, and the diaphragm, juſt at the ſtomach. Its trunk ſtretches forwards and downwards, and is divided into three large branches, called, from their deſtination, *hepatic*, *gaſtric* or *coronary*, and *ſplenic*, as will be mentioned in the ſplanchnology.

Superior Meſenteric Artery.

The *arteria meſenterica ſuperior* is azygous. It it emitted from the fore part of the aorta, a little below the cœliac, before the firſt lumbar vertebra, and is divided to the adjacent parts, eſpecially the meſocolon, as will be mentioned in the ſplanchnology.

Capſular Arteries.

The *arteriæ capſulares*, two in number, ſpring from the lateral parts of the aorta, or from the cœliac. They run to the capſulæ renales reſpectively.

Renal Arteries.

The *arteriæ renales*, or *emulgentes*, one on each ſide commonly, ſpring from the aorta below the capſulars and ſuperior meſenteric; the left one ſomewhat higher and more forward than the right one; each tends downwards and outwards, at angles with the aorta of about forty-five degrees; the right one paſſes behind the vena cava; and both reach the ſinuoſities or fiſſures of the reſpective kidnies, as will be afterwards mentioned, to which they are principally diſtributed.

Spermatic Arteries.

The *arteriæ ſpermaticæ*, commonly one on each ſide, derive their origin for the moſt from the aorta, below the renal arteries. When otherwiſe, it is from the renal or capſular arteries. They deſcend divergingly, forming very acute angles with the aorta; the right one paſſes ordinarily before the vena cava; they ſoon aſſociate with the veins of the ſame name, and paſs through their meſhes, called *vaſa pampiniformia*, behind the peritonæum; at the brim of the pelvis they croſs the ureters, and finally reach the rings of the internus obliquus abdominis, to run down to the teſticles, as parts of the ſpermatic cords, to be afterwards noticed.

Inferior Meſenteric Artery.

The *arteria meſenterica inferior* is azygous, and ſprings from the anterior part of the aorta, nearly in a middle point between the renal and iliac arteries, and is diſperſed in the meſentery chiefly.

Lumbar Arteries.

The *arteriæ lumbares*, five or ſix on each ſide, much reſemble the intercoſtal arteries, being diſtributed to the ſpinal marrow and lumbar region.

Anterior Sacral Artery.

The *arteria ſacra anterior* is unique, and derives its origin from the aorta, near the ſource of the iliacs, and ſometimes from them. It runs down along the middle of the os ſacrum, behind the rectum, to its extremity, giving off lateral anaſtomoſing branches.

Common Iliac Arteries.

The *arteriæ iliacæ communes*, or *primitivæ*, are the two branches into which the aorta is divided, oppoſite to the laſt lumbar vertebra, as mentioned above; they deſcend divergingly, and end each in a ſubdiviſion, nearly coinciding with the poſterior ſymphyſes of the pelvis, deſcribed in the

oſteology.

oſteology. They give off only a few very ſmall branches in this courſe.

The common ſubdiviſion of each iliac produces,

1. External iliac,
2. Internal iliac.

External Iliac Artery.

The *arteria iliaca externa*, or *cruralis*, which may be regarded as a continuation of the common iliac, runs along the external edge of the pſoas, till it end behind and a little under Paupart's ligament in the crural artery, ſtrictly ſo called.

Near its termination, it produces the

1. Epigaſtric,
2. Ilio-lumbar.

Epigaſtric Artery.

The *arteria epigaſtrica* iſſues from the external iliac, a little below and behind Paupart's ligament. After having formed a ſmall curvature downwards, it aſcends and inclines inwards, till it arrive at the poſterior face of the rectus abdominis, nearly oppoſite the point of the pyramidalis, croſſing the ſpermatic veſſels in its paſſage about an inch above the ring of the obliquus internus. It runs up along the rectus, giving off branches, till, near its top, it ends by anaſtomiſing with the internal mammary artery, as already noticed.

It is very intereſting to the Surgeon to be well acquainted with this artery. In the operation for femoral hernia, which is a protruſion of ſome of the abdominal viſcera behind and under Paupart's ligament, along the courſe of the external iliac artery, it is to be carefully avoided. It is generally on the external ſide of the hernia: This however can be judged of from the ſituation of the crural artery, which may be eaſily diſcovered. In the operation for inguinal hernia, which, as formerly mentioned, takes place through the ring of the obliquus internus, along the ſpermatic veſſels, it meets the knife when its edge is turned outwards and upwards, provided the inciſion be extenſive: Hence the propriety of directing it either upwards, or upwards and inwards. Indeed, when the inciſion is very limited, which ought always to be the caſe, it may be ſafely made in any of theſe directions, becauſe the artery is at ſome diſtance, as mentioned.

Attention is to be paid to it in making the inciſion of the external parts in the Cæſarean operation, which may be between this artery and the linea alba.

Ilio-lumbar Artery.

The *arteria ilio-lumbalis* ariſes from the inferior part of the external iliac, a very little below the epigaſtric; it inclines outwards to the ſpine of the os ilium, along which it bends within the abdominal muſcles, giving branches as it proceeds to the lumbar region, where it is loſt.

Internal Iliac Artery.

The *arteria iliaca interna*, or *hypogaſtrica*, ſinks backwards into the pelvis, and gives off many important arteries, viz.

1. Internal ilio-lumbar,
2. Lateral ſacral,
3. Poſterior iliac,

4. Obturator,
5. Iſchiatic,
6. Internal pudica,
7. Middle hæmorrhoidal,
8. Uterine,
9. Veſical,
10. Vaginal,
11. Umbilical.

Internal Ilio-lumbar.

The *ilio-lumbalis interna* much reſembles one of the lumbar arteries already mentioned, having nearly the ſame ſize and diſpoſition. It runs outwards, covered by the pſoas.

Lateral Sacral Arteries.

The *arteriæ ſacræ laterales* iſſue generally from the upper part of the internal iliac trunk, and commonly two on each ſide; they run to the adjacent parts, and ſend branches within the canal of the os ſacrum.

Poſterior Iliac Artery.

The *arteria iliaca poſterior* is large; it paſſes out of the pelvis, above the pyriformis muſcle of the thigh, to the muſcles ſituated on the dorſum of the os ilium and vicinity.

Obturator Artery.

The *arteria obturatrix* does not always ariſe from the internal iliac; ſometimes it goes off from the poſterior iliac, &c. It always accompanies the poſterior crural nerve to the hole in the obturator ligament, giving off branches to the parts adjacent, particularly the obturator muſcle, and others on the inſide of the thigh, and even to the genitals.

Iſchiatic Artery.

The *arteria iſchiatica* may be conſidered almoſt as the continuation of the trunk of the internal iliac. It paſſes from the pelvis, before the pyriformis, along with the iſchiatic nerve, after having given off branches within the pelvis, and is beſtowed on the glutæi, and other muſcles in the outer and poſterior part of the thigh.

Internal Pudica.

The *arteria pudica interna* ariſes from the iſchiatic artery; it paſſes out of the pelvis, below the ſacro-iſchiatic ligament, along the inſide of the tuberoſity and ramus of the os iſchii to the top of the arch of the pubes, where the corpora cavernoſa penis meet, and gives the profound and dorſal arteries of the penis, while other ſubordinate branches go to the bulb of the urethra and adjacent parts.

Theſe branches are wounded in the lateral operation for the ſtone; nay the trunk may be cut by the gorgeret when large, and give a very incommoding hæmorrhage.

Middle Hæmorrhoidal Artery.

The *arteria hæmorrhoidalis media* ariſes ſometimes from the iſchiatic artery. It is unconſtant.

It runs down commonly between the bladder and rectum, to the extremity of this laſt chiefly.

Uterine Artery.

The *arteria uterina* ſprings from the internal iliac, above the internal pudica for the moſt part. It paſſes in the interſtice of the laminæ that form the ligamenta lata uteri, to the lateral part of the uterus, near its cervix, and ſends its ramifications over this organ chiefly in an upward and beautifully ſerpentine manner. The extremities of ſuch branches as open on the lining membrane, and conſequently enter the uterine cavity, are menſtrual arteries, becauſe they pour out the menſes.

Veſical Artery.

The *arteria veſicæ urinariæ* goes off from the end of the internal iliac moſt commonly, and tends to the bladder, veſiculæ ſeminales, vas deferens, and beginning of the urethra.

Vaginal Artery.

The *arteria vaginæ uteri* is derived from the trunks of the iſchiatic or internal pudica; it advances to the lower part of the vagina, and anaſtomoſes with the neighbouring arteries.

Umbilical Artery.

The *arteriæ umbilicales*, through the greateſt part of their courſe, are peculiar to the fœtus, and become impervious ſoon after birth. They ſpring from the internal iliacs, or rather ſeem to be a continuation of them. Their courſe to the umbilicus, through it, and along the umbilical chord, and in the Placenta is deſcribed with the gravid uterus.

ARTERIES OF THE SUPERIOR EXTREMITY.

Subclavian Artery.

The *arteria ſubclavia* of the right ſide ariſes from the curvature of the aorta in common with the right carotid, it then inclines to the triangular ſpace between the anterior and middle ſcaleni muſcles through which it paſſes lying in a peculiar impreſſion in the upper ſurface of the firſt rib, mentioned in the myology and oſteology, where it takes the name of auxiliary artery.

The left ſubclavian ariſes immediately and by itſelf from the arch of the aorta.

Each ſubclavian gives off

1 Internal mammary,
2 Inferior thyroid,
3 Profound cervical
4 Superficial cervical
5 Superior intercoſtal.

Internal Mammary Artery.

The *arteria mamaria interna* ariſes from the ſubclavian immediately above the pleuræ.

It deſcends very near the edge of the ſternum along the cartilages of the ſeven or eighth ſuperior ribs ; then inclining a little outwards it anaſtomoſes with the Epigaſtric.

In this courſe it diſtributes branches to the bronchia, the thymus, and diaphragm ; the laſt attend the phrenic nerves. It alſo ſends arteries to the mediaſtinum and intercoſtal ſpaces. In each intercoſtal interſtice two branches pierce through the muſcles, one higher than the other. and are diſtributed to the pectoral muſcles and mammary glands : theſe are of conſiderable ſize, and when divided in amputation of the breaſt, they give a briſk haemorrhage.

Inferior Thyroid Artery.

The *arteria thyroida inferior*, originates from the ſubclavian, and after diſtributing four branches it reaches the thyroid gland, and anaſtomoſes with the ſuperior one.

Profound Cervical Artery.

The *arteria cervicalis profunda* ariſes ſometimes from the ſubclavian immediately, and ſometimes from its branches, and is diſtributed along the ſides of the cervical vertebræ, anaſtomoſing with the vertebral and occipital arteries.

Superficial Cervical Artery.

The *arteria cervicalis ſuperficialis*, (which is ſometimes wanting) ariſes from the ſubclavian near the ſcaleni muſcles, and is chiefly ſent to the muſcles about the top of the ſhoulder.

Superior Intercoſtal Artery.

The *arteria intercoſtalis ſuperior*, ariſes from the ſubclavian aud ſerves the three ſuperior intercoſtal ſpaces.

AXILLARY ARTERY.

The *arteria axillaris*, which is a continuation of the ſubclavian, commences at the ſcaleni muſcles, and ends in the humeral or brachial artery, nearly oppoſite to the ſhoulder joint.

This artery ſends three or four branches downwards, chiefly under the names of ſuperior, middle, and inferior mammaries, the laſt of which is commonly called external mammary.

Beſides theſe, this artery gives off the humeral thoracic, the axillary thoracic, the ſuperior and inferior ſcapularies and the circumflex.

The axillary artery, as is obſerved in the neurology, paſſes through one of the meſhes of the axillary plexus, from within outwards.

The contiguity of this great artery to the nerves in the armpit and to the axillary glands, deſerves to be recollected by the ſurgeon, particularly when attempting the amputation of theſe glands.

Humeral Artery.

The *arteria humeralis* is a continuation of the axillary one, and therefore begins near the head of the os humeri, and ends a little below the elbow joint in the ulnar and radial arteries. In ſome inſtances theſe have ariſen from the axillary one immediately.

This artery lies behind the internal edge of the Biceps muſcle, about the middle of the arm, and is nearly in contact with its tendon, and is covered by its aponeuroſis, before the elbow joint, or at the flexure of the arm, ſo that the ſurgeon may, in every caſe, eaſily know its ſituation.

Many ſmall branches that may be called lateral anaſtomoſing arteries, go off from this artery; two principal ones may be mentioned.

The firſt named *arteria profunda ſuperior*, ariſes a little below the head of the os humeri, and inclines inwards; the other called *arteria profunda inferior* or *circumflexa*, is ſent off lower conſiderably than the former, chiefly in an inward direction, and anaſtomoſes with branches above and below the joint.

There is a conſiderable diverſity in the diſpoſition of theſe ſmaller arteries in different ſubjects. By means of their anaſtomoſes with the arteries below the articulation they maintain the circulation, although the humeral artery be obſtructed by the operation for aneuryſm or other cauſes.

The Ulnar Artery.

The *arteria ulnaris* ſeems to be a continuation of the trunk of the humeral artery. It inclines to the inner edge of the fore-arm, under the flexor muſcles, and runs in the direction of the ulna, (hence the name) near the inferior extremity of which it becomes ſuperficial, and its pulſes may be readily felt. It then paſſes by the inner edge of the os piſiforme, under the annular ligament of the wriſt to the palm, where it forms with the radial artery the palmar arch which is covered by the palmar aponeuroſis.

In all this courſe the ulnar artery ſends off many branches, ſome of which, near the internal condyle of the os humeri, anaſtomoſe with thoſe of the humeral artery as mentioned.

Radial

Radial Artery.

The *arteria radialis*, ſo named becauſe it in general follows the direction of the radius, is ſmaller than the ulnar one, and in ſome inſtances looks like a branch of it. It tends to the edge of the fore-arm under the muſcles: near the wriſt as every one knows, it is quite ſuperficial, lying on the flattened ſurface of the radius, where its pulſes are uſually felt by the Phyſician, when he wiſhes to know the rate of the blood's motion.

The radial artery runs downwards to the palm, under the annular ligament, after ſending a conſiderable branch by the root of the thumb backwards, chiefly to the muſcles between the thumb and fore-finger. In all this courſe many lateral branches go off, ſome of them anaſtomoſe with ſimilar ones from the humeral artery.

In the palm this artery anaſtomoſes with the ulnar one as deſcribed, and forms an arch with its convexity downwards, from which branches are beautifully ſent off correſponding to the interſtices of the metacarpal bones; each, at the roots of the fingers, is divided into two branches, that run along the ſheaths of the tendons to their extremities, where that of the one ſide of the finger anaſtomoſes with that of the other. The pulſation of theſe arteries can be eaſily felt.

Interoſſeous Artery.

The *arteria interoſſea* is comparatively ſmall, it is chiefly beſtowed on the parts between the bones of the fore-arm, hence its name.

It ſprings from the ulnar artery, and runs downwards along the inner face of the interoſſeous ligament, and conſequently between it and the pronator quadratus to the wriſt and adjacent parts.

Near its beginning this artery ſends a branch backwards, through an opening above the interoſſeous ligament, under the name of *interoſſea externa*, which is loſt by its ramifying in the neighbouring muſcles.

ARTERIES OF THE INFERIOR EXTREMITY.

The inferior extremity derives its arteries from the Iliacs.

Crural or Femoral artery.

The *arteria cruralis or femoralis* is a continuation of the external Iliac under Paupart's ligament. In the groin it is ſuperficial, and can be perceived to beat near the inguinal glands: on this account caution is neceſſary in conducting inciſions of theſe or the adjacent parts.

The courſe of this artery along the inſide of the thigh is ſomewhat ſpiral, ſo that it paſſes between the tendon of the adductor magnus and the thigh bone, and reaches the ham under the name of Popliteal artery (arteria poplitæa.)

Through the greateſt ſhare of this courſe it is covered ſomewhat by the inner edge of the ſartorius muſcle.

Not far from the groin the femoral artery ſends off a large branch called *arteria profunda*, that is principally beſtowed on the muſcles on the back part of the thigh: this anaſtomoſes with the arteries below it as well as with thoſe of the pelvis, by which means the tranſmiſſion of the blood is mantained although the femoral artery ſhould be obſtructed; a circumſtance of the greateſt importance in treating wounds of the ſuperior part of this artery.

From the under part branches reach the knee-joint, and laterally anaſtomoſe with arteries of the leg ſtrictly ſo called; and thus mantain the circulation of the blood, although the Popliteal artery be impervious.

The poſterior and upper part of the thigh receives two large arteries from thoſe in the pelvis through the Iſchiatic notch.

1 Glutaeal artery,
2 Iſchiatic artery.

GLUTAEAL ARTERY.

The *arteria glutæa* of conſiderable ſize, and inflected upwards, is diſtributed to the Glutæi muſcles and neighbouring parts.

Iſchiatic Artery.

The *arteria Iſchiatica*, accompanies for a conſiderable way the ſciatic nerves, and by ramifying its trunk gradually diſappears, as has been already obſerved.

Theſe branches give great hæmorrhage, and require to be cloſed when amputation is performed high in the thigh.

The Popliteal artery lies between the hamſtrings, only covered by cellular ſubſtance and the common integuments, therefore its pulſation may be diſtinctly felt, and the motion of the blood in it fully ſuppreſſed by the tournequete during amputation in the leg, &c.

This artery is continued downwards, between the heads of the Solæus and Gaſtrocnemius muſcles it is divided into

1 Anterior tibial, }
2 Poſterior tibial, } artery
3 Interoſſeous. }

Anterior Tibial Artery.

The *arteria tibialis antica* is a large branch of the popliteal, that paſſes through between the heads of the leg bones and above the interoſſeous ligament, and then runs down on the forepart of the leg ſomewhat covered by the muſcles, which it ſupplies by numerous branches; ſome of the uppermoſt ones join, as mentioned, with thoſe of the femoral artery.

At the ankle, this artery paſſes under the annular ligaments, and gives branches to the upper part of the foot and great toe, and then ſinks to the ſole, and anaſtomoſes with the

Poſterior Tibial Artery.

The *arteria tibialis poſtica* may be conſidered as the continuation of the popliteal, becauſe it runs almoſt ſtraight downwards, between the muſcles on the back part of the leg, giving off numerous branches; after which it paſſes to the ſole behind the inner ankle, and forms an arch with the tibialis antica,

tica, that may be called the plantar arch: from the convexity of which branches go to the toes, exactly in the ſame manner that the palmar arch ſends arteries to the fingers.

Interoſſeous Artery.

The *arteria interoſſea* or *peronæa* is ſmaller than any of the two laſt deſcribed arteries. It follows the direction of the fibula or perone, lying near its inner angle, and after ſupplying the adjacent muſcles, anaſtomoſes with the arteries of the foot.

The Venous Syſtem.

It has been remarked, that the veins return the blood to the heart, and terminate in the auricles, viz. vena cava ſuperior and inferior in the right, and the four pulmonary veins in the left one.

For the ſake of perſpicuity it may be proper to deſcribe the veins like the arteries, as proceeding from the heart, which ſome call the anatomical method.

Vena Cava Superior or Deſcendens.

This great veſſel is ſhort; a ſmall part of it is concealed within the pericardium; near which on the back part, it receives a conſiderable branch called *vena azygos*, which correſponds to the intercoſtal arteries, being made up of the intercoſtal veins that can not ſeverally reach the vena cava. On the fore part a vein from the thymus and the internal mammary one, [illegible] the artery of that name fall into it.

Subclavian Veins.

The *ſuperior vena cava* is divided into the right and left ſubclavian veins, that correſpond to the ſubclavian arteries. The left one is longeſt, and lies near the top of the ſternum, and before the arteries that ariſe from the arch of the aorta, and ſcaleni muſcles.

Each ſubclavian ſends a large deep-ſeated branch up the ſide of the neck, under the name of *internal jugular*, that after receiving branches from the adjacent parts enters the ſkull by its proper hole, and forms the ſinuſſes in the dura mater already deſcribed.

The internal jugulars lie a little more outwardly than the carotid arteries: their inferior part is covered by the ſterno-cleido-maſtoid muſcles, platyſma myoides and integuments only: theſe being divided they become viſible, and may be opened with much advantage by the lancet, in ſuch caſes as require a ſudden depletion of the veſſels of the brain, when the vis a tergo is much diminiſhed, as in apoplexy, aſphyxia from hanging, drowning, &c.

At a little diſtance from the internal jugulars, the ſubclavian veins receive the external ones, ſometimes two on each ſide, and named from their ſituation, anterior and poſterior, the firſt of which is moſt frequently wanting.

The external jugulars are made up of branches from the integuments of the head, and in general from the external parts, and therefore correſpond to the external carotids, as the internal ones do to the internal carotids, and vertebral arteries. They receive ſome branches called Emiſſaria, through holes deſcribed in the ſkull, a conſtitution of the greateſt importance.

The external jugulars in the more acceſſible points are reſorted to for blood-letting in many caſes of inflammation of the adjacent parts. The Phlebotomiſt ought to conſider well their poſition as to the carotids, and to turn the point of his lancet from theſe arteries, which is no difficult matter.

The ſubclavian veins terminate in the axillary, and theſe laſt in the brachial veins. In the extremities there is a double order of veins, viz. the deep-ſeated and ſuperficial; the laſt of which alone require to be deſcribed, becauſe the courſe of the firſt is the ſame with that of the arteries which they accompany, and to which they cloſely adhere by the intervention of cellular ſubſtance: for the moſt part two of theſe veins attend on one artery.

Juſt where the ſubclavian becomes axillary vein, it receives a ſuperficial branch called *cephalic*, which aſcends, gathering branches in its courſe, from the external ſurface of the hand, along the outer edge of the arm at the elbow, and paſſes along the biceps flexor cubiti, and between the pectoral and deltoid muſcles.

The veins on the fore part of the wriſt form a branch near the flexure of the arm called *median*, from its ſituation with reſpect to the cephalic, and another more internal called *baſilic*, which is made up of branches from the inner edge of the hand and fore-arm, particularly one from the little finger, called *vena ſalvatella*.

The median vein often divides into two branches that run obliquely, and join reſpectively with the cephalic and baſilic, and therefore called *median-cephalic* and *median-baſilic* veins the former one croſſes over the humeral artery, as it lies by the edge of the tendon of the biceps and alſo the radial nerve, and therefore requires caution in the Phlebotomiſt.

The baſilic ends in the humeral vein, about the middle of the arm.

It may be obſerved that the diſpoſition of the ſuperficial veins is exceedingly diverſified.

Vena Cava Inferior or Deſcendens.

The *inferior* or *deſcendens vena cava*, immediately below the diaphragm, receives the *hepatic veins* from the liver, and conſequently the blood returned by the vena portarum, and near the ſame point the *phrenic veins* from the diaphragm, and at correſponding points the *capſular*, *renal*, and *right ſpermatic veins*, from the renal capſuls kidnies, and right teſticle, reſpectively. The left ſpermatic vein ends in the left emulgent vein.

Like the aorta, the *vena cava* is divided into the *Iliacs* external and internal, the former are continued over the pelvis under Paupart's ligament, and become crural veins.

Each crural vein is divided into profound and ſuperficial branches, the former accompany the crural artery.

The principal ſuperficial vein is called *ſaphena*, and ariſes from the upper part of the foot near the ankle, and acquiring an increaſe, it paſſes on the inſide of the knee and thigh, and ends in the crural vein, near the profound one.

The vena ſaphena is opened in blood letting at the ankle.

The veins of the extremities contain valves from point to point to prevent retrograde motion from gravitation, varied poſture, preſſure, &c.

The LYMPHATIC SYSTEM.

The Lymphatics have lately and moſt deſervedly engaged the attention of Anatomiſts: a general knowledge of them is all that ſeems to be neceſſary in practice.

Theſe veſſels, frequently called abſorbents from their office, are really a part of the venous ſyſtem, and intended chiefly to correſpond to the exhalant part of the arterial one.

They are delicate pellucid tubes, copiouſly provided with valves like the veins. It would appear they take their origin from the ſurfaces, cavities, and cells of the ſyſtem at large, by ſmall orifices; what may be called lymphatic trunks are not large, but, according to ſome anatomiſts, exceedingly numerous, and have frequent anaſtomſes with one another.

In the extremities, like the veins, they are ſuperficial and profound: the latter accompany the blood-veſſels, while the former lie immediately within the integuments, and ariſe from them and the cellular ſubſtance chiefly.

Theſe veſſels are perhaps preſent in every organ of the body; all of them ſeem to be united in one great trunk, called the thoracic duct; at leaſt as yet, any other trunks opening into the veins have not been diſtinctly demonſtrated.

The Lymphatics from the inferior extremities,

mities, after paſſing through the loweſt inguinal glands, reach other glands ſituated within the pelvis.

Thoſe that ariſe from the genitals in both ſexes run to the uppermoſt inguinal glands, and like the others enter the pelvis. Thoſe on the abdominal ſurface take the ſame courſe.

They ſtretch upwards along the iliac bloodveſſels, where they meet with the Lymphatics that ariſe within the pelvis.

It was already obſerved in the Splanchnology, that the lacteals are in fact lymphatics of the inteſtine; and therefore juſtly to be regarded as making one ſyſtem with the lymphatics commonly ſo called.

The lymphatics from below meet with the lacteal or inteſtinal ones at and behind the right emulgent artery, and form what has been called the receptaculum chyli, or lacteal ſac. It is the beginning of the thoracic duct, or common lymphatic trunk.

The thoracic duct has the ſame habit with any of its branches. Its ſize is nearly equal to that of a gooſe-quill. It runs along the ſpine, between the vena azygos and aorta, and ſomewhat behind the inferior vena cava, ſurrounded by cellular ſubſtance; and conſequently it is tranſmitted through the aortic opening of the diaphragm.

In its courſe along the cheſt, it will be recollected, that it lies without and between the pleuræ. It here receives the ſuperior hepatic, and pulmonary lymphatics

Behind the heart, it inclines a little to the left, and paſſes upwards under the arch of the aorta, ſo as to reach the left ſubclavian vein, near the root of the internal jugular, in which it ends by a correſponding orifice, provided with a valve.

This important veſſel is ſomewhat waved in its courſe, and not ſeldom ſubdivided for ſome part of it.

The lymphatics of the ſuperior extremities are diſpoſed in the ſame way as thoſe of the inferior ones; they all reach the axillary glands, where they are joined by thoſe of the mammæ and exterior parts of the cheſt.

The lymphatics of the head ſtretch down along the ſides of the neck, near the jugular veins, where many glands are eaſily felt, and enter the cheſt along with thoſe of the arms and external parts of the cheſt, and fall into the thoracic duct, or into the left ſubclavian vein near it.

By attending to the courſe of the lymphatics, the practitioner can often explain the propagation of diſeaſe, and purſue proper plans of cure.

EXPLANATON OF THE TABLES.

TABLE A.

A front View of the full-ſized adult Skull, and Bones of the Face.

Frontal Bone.

A Fore part.

B Portion of the temporal foſſa formed by this bone for lodging the cratophite or temporal muſcle.

C Part of the coronal ſuture, which is covered by the temporal muſcle.

D Superciliary proceſs.

E External angular proceſs.

F Internal angular proceſs.

G Orbitar proceſs.

H Foſſa in which the lachrymal gland is partly lodged.

I Junction of the frontal and naſal bones by a ſuture named tranſverſe, becauſe it extends from temple to temple.

The naſal or azygous proceſs lies immediately under, but covered by the naſal bones.

From A to I is the extent of the ſpine, to which the falx of the dura mater is fixed, and which is to be avoided in the operation of the trepan.

M

K Superciliary notch or hole.

L Eminences marking the ſituation of the frontal ſinus.

Parietal Bone.

M Anterior inferior angle or proceſs.

Temporal Bone.

N Part of the ſquamous portion.

O Anterior part of the zygomatic proceſs.

Sphenoidal Bone.

P Temporal proceſs.

Q Orbitar proceſs.

Ethmoidal Bone.

R Os planum.

S Optic hole in the bottom of the orbit, and the orbitar ſurface of the palate bone; and adjoining the ſuperior and inferior orbitar fiſſures.

Maxillary Bone.

a Its body.

b Naſal proceſs, to which the tendon of the orbicularis palpebrarum adheres, and which forms a part of the lachrymal duct.

c Orbitar proceſs.

d Alveolary proceſs or border, with ridges correſponding to the ſockets.

e Tuberoſity, or end of the alveolary proceſs.

f Naſal notch, or inferior margin of the noſtril.

Within the noſtril are ſeen, the anterior grooved edge of the vomer, a part of the ſeptum naſi, or partition of the noſtrils, and the anterior ends of the os ſpongioſum, ſuperior and inferior.

g Malar proceſs.

h Orifice of the external orbitar foramen.

Naſal Bone.

i Its dorſum, with its ſmall hole.

Malar Bone.

k Its middle.
l Superior orbitar proceſs.
m Inferior orbitar proceſs.
n Internal orbitar proceſs.
o Zygomatic proceſs.

Os Unguis.

p Its orbitar and lachrymal proceſſes.

Lower Jaw.

q Chin.
r Baſe.

ſ Angle.

t Alveolary proceſs, with ſockets like thoſe of the upper jaw.

u Orifice that communicates with the canals within the jaw.

1, 1, 1, 1, Inciſor teeth in each jaw.

2, 2, Canine teeth in each ſide of each jaw.

3, &c. Grinders in each ſide of each jaw.

TABLE

TABLE B.

A lateral View or Profile of the full-ſized adult Skull, and Bones of the Face.

Frontal Bone.

A Its fore part.

B The portion which it contributes to the temporal foſſa, circumſcribed by the circular line bbb, to which the margin of the temporal muſcle adheres.

CC The left part of the coronal ſuture, which becomes ſomewhat rectilinear as it approaches to the ſphenoidal one in the temporal foſſa, where it is covered by the temporal muſcle.

D External angular proceſs.
E Internal angular proceſs.
F Superciliary proceſs.
G Orbitar proceſs.
H Foſſa of the lachrymal gland.
I Superciliary hole.
K Prominence cauſed by the frontal ſinus.
LL Orbitar holes, internal and external.

Parietal Bone.

M Left one.
N Anterior inferior angle or proceſs.

O Poſterior inferior proceſs.

PP Left part of the lambdoidal ſuture, containing ſome oſſa triquetra.

Q A portion of the occipital bone.

Temporal Bone.

R Squamous portion.

SS Temporal or ſquamous ſuture.

T Zygomatic proceſs.

U Maſtoid proceſs.

V Auditory proceſs, and above it the meatus auditorius externus.

Ethmoidal Bone.

W Os planum.

Sphenoidal Bone.

X Temporal proceſs.

Maxillary Bone.

a Its body.

b Naſal proceſs, forming a ſhare of the lachrymal duct.

c Orbitar proceſs.

dd Alveolary proceſs, with eminences cauſed by the teeth.

e Tuberoſity, or end of the alveolary proceſs.

f Naſal notch, or under brim of the noſtril.

g Malar proceſs.
h External orbitar hole.
i Left naſal bone, with its hole.

Malar Bone.

k Its body.
l Superior orbitar proceſs.
m Inferior orbitar proceſs.
n Internal orbitar proceſs.
o Maxillary proceſs.
p Zygomatic proceſs.

Os Unguis.

q Orbitar and lachrymal portions.

Lower Jaw.

r Left ſide.
ſ Chin.
t Orifice leading to the canal.
uu Baſe.
v Angle.
w Coronoid proceſs.
x Condyloid proceſs.

Teeth.

1, 1, 1, Inciſors.
2, 2, Canine.
3, 3, *&c.* Grinders.

TABLE C.

A View of the Baſe of the Skull, and Upper Jaw.

Parietal Bone.

A Inferior poſterior angle or proceſs.
BB Part of the lambdoidal ſuture.

Occipital Bone.

CC Tranſverſe line that is the limit between the upper or ſmooth, and inferior or unequal ſurface.

D Occipital hole tranſmitting the ſpinal marrow, vertebral arteries, *&c.*

E Cuneiform proceſs.

FF Condyles.

GG Venous holes behind the condyles.

Temporal Bone.

H Squamous portion.

II Squamous or falſe ſuture.

K Maſtoid proceſs.

L Root or beginning of the zygomatic proceſs.

M Styloid proceſs.

N External paſſage to the ear (meatus auditorius externus), bounded on the under part by the auditory proceſs.

O Maxillary or articular cavity for the lower jaw.

P Carotid hole.

Q Thimble-like cavity, or jugular foſſa, for the top of the internal jugular vein.

Sphenoidal Bone.

RR Pterygoid foſſæ, bounded by the external and internal alæ and intercepting the poſterior nares or openings of the noſe.

S Temporal proceſs.

T Spinous proceſs, and ſpinous hole.

Maxillary Bone.

a Under part of the body of this bone.

b Palatal proceſs making part of the roof of the mouth.

c Inciſive hole common to both maxillary bones.

Malar Bone.

d Cavity turned to the temporal foſſa.

e Zygomatic proceſs.

Palate Bone.

f Palatal proceſs.

Vomer.

g Poſterior edge.

Teeth.

1, 1, 1, 1, The inciſor teeth.

2, 2, Canine teeth.

3, 3, *&c.* Malar teeth, or grinders.

TABLE D.

A View of the Baſe of the Skull, after the upper Part has been removed by the Saw.

Frontal Bone.

A Left anterior foſſa or cavity, that lodges one of the anterior lobes of the cerebrum, covered with waving ridges cauſed by the convolutions.

B Foramen cæcum or blind hole, and beginning of the ſpine, to which the fore part of the falx is attached.

Ethmoidal Bone.

C Left portion of the cribriform plate, divided from the right one by the criſta galli: its holes tranſmit the olfactory or firſt pair of nerves to the noſe.

Sphenoidal Bone.

D Sella turcica, in which the pituitary gland is lodged.

Under the ſella turcica, in the body of the bone are formed the ſinuſſes that are part of the naſal cavity.

E The anterior clinoid proceſs.

F Poſterior clinoid proceſs.

G Lateral portion, forming part of the left middle foſſa for the correſponding lobe of the cerebrum.

H Tranſverſe ſpinous proceſs.

I Optic hole, that gives paſſage to the optic or ſecond pair of nerves.

K Superior orbitar fiſſure that tranſmits the third, fourth, firſt branch of the fifth and ſixth pairs of nerves.

L Hole for the ſuperior maxillary, or ſecond branch of the fifth pair of nerves.

M Hole for the inferior maxillary, or third branch of the fifth pair of nerves.

N Spinous hole for the middle artery of the dura mater to enter by.

O Suture common to the ſphenoidal and temporal bones.

Temporal Bone.

P Squamous portion, which completes the middle foſſa or cavity of the baſe of the ſkull, to admit the middle lobe of the cerebrum.

Q Petrous portion, containing the tympanum and other cavities of the ear.

R Meatus auditorius internus, or hole for the ſeventh pair of nerves.

S Anterior part of the foramen lacerum, common to the temporal and occipital bones, through which the eighth pair of nerves paſſes outwards.

T Poſterior part of the foramen lacerum, b which the lateral ſinus paſſes outwards to become the internal jugular vein.

U Occipital angle, with a ſhare of the groove for the lateral ſinus about to enter the foramen lacerum.

Occipital Bone.

V Cuneiform proceſs on which the medulla oblongata reſts.

W Hole by which the ninth pair of nerves paſs forwards.

X Occipital hole for the ſpinal marrow, tenth pair of nerves, vertebral arteries, &c.

Y Poſterior foſſa of the baſe of the ſkull, which receives the correſponding lobe of the cerebellum.

ZZ Groove for the lateral ſinus.

zz Inferior part of the ſpine to which the falx of the cerebellum is fixed.

a a Zygoma formed by the zygomatic proceſſes of the temporal and malar bones, within which the temporal muſcle paſſes.

b Maſtoid proceſs.

c c External ſurface of the occipital bone.

TABLE E.

A View of the Bones of the Upper Jaw, detached from the Skull, and from one another.

FIG. I.

An outſide View of the Maxillary Bone.

A Body of the bone.
B Naſal proceſs.
C Orbitar proceſs.
D D Alveolary proceſs.
E Tuberoſity.
F A portion of the palate bone adhering.
G Naſal notch.
H Malar proceſs.
I External orbitar foramen.
1, 1, Inciſor teeth.
2, 2, Canine teeth.
3, 3, *&c.* Malar teeth.

FIG. II.

An inſide View of the Maxillary bone.

A Naſal proceſs.
BB Palatal proceſs.
CC Alveolary proceſs with the teeth.
DD Rough edge of the palatal proceſs, by which it adheres to that of the other exactly

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in the vertical plane that divides the body into halves.

E Orifice of the ſinus maxillaris.
F Under part of the lachrymal duct.
G Naſal notch.
HHH Palatal bone adhering in its place.

FIG. III.

An outſide View of the Naſal Bones.

AA Upper extremities, by which they reſt on the naſal proceſs of the frontal bone.

BB Under ends, thin and ragged, by which they are connected with the cartilaginous part of the noſe.

FIG. IV.

A View of the inſide of the Naſal Bones.

FIG. V.

A View of the outſide of the Os Unguis.

A Orbitar proceſs.
B Lachrymal proceſs.

FIG. VI.

An inſide View of the Os Unguis.

FIG. VII.

An outſide View of the Malar Bone.

A Superior orbitar proceſs.
B Inferior orbitar proceſs.

C Internal orbitar proceſs.
D Maxilliary proceſs.
E Zygomatic proceſs.
F Small hole.

Fig. VIII.

An inſide View of the Malar Bone.

The letters mark the ſame parts as in Fig. VII.

Fig. IX.

A View of the Side of the right Os Spongioſum inferius that is turned outwards, or to the Maxillary Bone.

A Inferior convoluted edge.

B Superior edge, with a broad ſurface, by which it is partly fixed to the maxillary bone.

C Anterior extremity.

D Poſterior extremity that touches the os unguis.

Fig. X.

A View of the Side of the Os Spongioſum Inferius, that is turned inwards, or to the Septum of the Noſe, which is ſomewhat convex and ſpongy.

Fig. XI.

A View of the left Palate Bone.

A Palatal portion.
B Pterygoid portion.

C Naſal portion.
D Orbitar portion.

FIG. XII.

A View of the Palate Bone, from a point of view

A Notch that receives the internal alæ of the pterygoid proceſs of the ſphenoidal bone; and completes its foſſa.

B Orbitar portion, more directly ſeen than in the former figure.

FIG. XIII.

A Side View of the Vomer.

A Socket on its poſterior edge, to contain the azygous proceſs of the ſphenoidal bone.

B Anterior edge, with its fiſſure, to hold the middle cartilage of the noſe.

C Inferior edge, to be joined to the correſponding groove made by the palatal proceſſes of the maxillary bones immediately above the roof of the mouth.

TABLE F.

FIGURE I.

A View of the Sockets and Oſſeous Part of the Palate.

A Sockets of the two right inciſors.

B Socket of the canine or eye-tooth.

C Sockets of the two ſmall grinders, which, like the inciſors and canine teeth are ſingle-fanged.

D Sockets of the three large grinders with three fangs, the hindmoſt of which is that of the dens ſapientiæ.

E Palatal proceſs of the maxillary bone.

F Palatal portion of the palate bone.

G Points of the pterygoid proceſs of the ſphenoidal bone.

FIG. II.

A View of the Sockets of the Lower Jaw.

A Sockets of the inciſors.

B Sockets of the canine teeth (cuſpidati).

C Sockets of the four ſmall grinders (bicuſpides).

D Sockets of the large grinders, which in the lower jaw have each two fangs.

EE Coronoid proceſſes.

FF Condyloid proceſſes, which are each covered with a moveable cartilage.

FIG. III.

A View of the Manner in which the Fangs of the Teeth occupy their Sockets in both Jaws; the external Plate of the Alveolary Proceſſes being carefully ſeparated by the Saw.

FIG. IV.

A View of ſeven Teeth, entirely detached from their Sockets, that their various Form may be attended to.

A The body of an inciſor of the upper jaw, ſeen from within.

B Its cervix or neck where the enamel ends.

C Its ſtraight fang.

D An inciſor of the lower jaw, which is ſmaller than that of the upper one.

E Inſide of the pointed body of a canine tooth, with its ſtrong and long fang.

F A ſmall grinder with its ſtraight ſingle fang.

G A large grinder of the under jaw, with its fangs crooked at their points; a circumſtance which renders the operation of drawing difficult and painful; for it is obvious that either they or the ſocket muſt be broken.

H A large grinder of the upper jaw, with its three fangs, which are generally a good deal ſpread, by which it is more difficult and painful to extract them than their fellows of the under jaw.

I A very large grinder, with the appearance of four fangs.

FIG. V.

A View of nine young Teeth in various Degrees of Growth.

A The body of an inciſor, the fang as yet not evolved.

B The body of a ſmall grinder.

C The body of a canine tooth.

D The body of a large grinder.

E The body and part of the fangs of a large grinder.

F The body and part of the fangs of a large grinder, in ſomewhat more progreſs than the former.

G A canine tooth, nearly complete.

H H Two inciſors in the ſame ſtate with the former.

FIG. VI.

A View of the Diſpoſition of the two Sets of Teeth, and their Sockets, in both Jaws, at the Time of ſhedding the Milk Teeth.

1, 1, 1, 1, The milk teeth in both jaws, about to fall out.

2, 2, 2, 2, The adult teeth proceeding to the edge of the alveolary borders.

FIG.

Fig. VII.

A View of both Jaws of the aged Subject from which the Alveolary Borders, or the Sockets and Teeth have fallen off; in Conſequence of which the Jaws become narrower, and the Chin gets an uncouth Projection; at the ſame Time the Cavity of the Mouth is leſſened.

A Chin.
B Upper jaw.
C C Naſal cavity.

Fig. VIII.

A View of the Bones of the Ear, or Tympanum, in proper Connection, and likewiſe detached from one another.

A Incus.
B Malleus.
C Stapes.
D Os orbiculare.

Fig. IX.

A View of the Bones of the Ear, in due Articulation, much magnified, and covered with their Perioſteum, and the Integuments in which Blood Veſſels are repreſented.

A Incus.
B Malleus.

C Stapes.
D Os orbiculare.

Fig. X.

A View of the Temporal Bone of the young Subject, with the Bones of the Ear properly diſpoſed in the Tympanum, from which the Membrane has been removed.

Fig. XI.

A View of the Tympanum, with its Membrane, through which the Bones of the Ear are obſervable.

Fig. XII.

A View of the Auditory Canals as they appear in the young Subject.

Fig. XIII.

A View of the Os Hyoides.

A The baſe.
B The cornua.
C The appendices.

TABLE G.

A View of the Bones of the upper Part of the Trunk.

Cervical Vertebræ.

A A, *&c.* Anterior part of their bodies.

B Tranſverſe proceſſes.

C Holes in the tranſverſe proceſſes, ſo arranged as to form a canal for one of the vertebral arteries.

D Odontoid proceſs of the ſecond vertebra, appearing above the firſt one after it has paſſed through its articular notch, ſo as to touch nearly the cuneiform proceſs of the occipital bone, to which it is connected by a ligament.

Dorſal Vertebræ.

E E, *&c.* Anterior part of their bodies, forming a backward curve by which the cheſt is enlarged.

F F, *&c.* Tranſverſe proceſſes to which the knobs of the ribs are joined.

G G, *&c.* Anterior ſurface of the ribs.

H H, *&c.* Cartilages of the ſeven uppermoſt or true ribs, by which they are joined immediately to the ſternum.

I I I, *&c.* Cartilages of the five undermoſt or falſe ribs, by which they are connected with the ſternum intermediately.

G

K Head of the firſt rib in its cavity in the firſt dorſal vertebra.

L Knob or tuberoſity of the firſt rib, connected to the tranſverſe proceſs of the firſt vertebra.

M Groove formed by the ſubclavian artery.

N Head of the ſecond rib, lodged in its cavity formed by the firſt and ſecond dorſal vertebræ, with the tranſverſe proceſs of the laſt of which its knob is joined.

Sternum.

O Uppermoſt piece which ſupports the fore ends of the clavicles by its notched angles.

P Middle and longeſt piece, arched ſomewhat forwards.

Q Xiphoid cartilage, or loweſt pointed piece.

Scapula.

R Glenoid cavity that receives the head of the os humeri.

S Acromion proceſs, to which the end of the clavicle is articulated.

T Point of the coracoid proceſs.

U Inferior coſta which falls in with the poſterior border of the arm-pit.

V Part of the anterior hollow face of this bone.

Clavicle.

W Sternal or fore end, joined to the breaſt-bone.

X Scapular or hind end, tied to the acromion.

Y Middle portion that arches forwards.

G

TABLE H.

FIGURE I.

A View of the Bones of the under Part of the Trunk.

Dorſal Vertebræ.

A Body of the loweſt one.

Ribs.

B B, *&c.* Anterior extremities of the three loweſt ribs of the left, and two loweſt of the right ſide.

C C, &c. Their cartilages.

Lumbar Vertebræ.

D D, *&c.* Anterior part of their bodies, that arch conſiderably forwards oppoſite to the loins.

d d d d Intervertebral cartilages.

E E E E Left tranſverſe proceſſes.

F F F Points of the three undermoſt right tranſverſe proceſſes,

G G G Points of three ſpinous proceſſes.

Os Sacrum.

H Middle of its upper ſide, directly above which is the articular ſurface joined with the laſt lumbar vertebra.

I I I I I Anterior ſurface of five of the original pieces. called falſe vertebræ, on account of their concretion in the lines i i i i, ſo diſpoſed as to form a hollow, named concavity of the os ſacrum.

K K K K Slanting orifices of the ſacral nerves, five on each ſide, which diminiſh as they deſcend and correſpond to the interſtices of the ſix falſe vertebræ.

Os Ilium.

L Foſſa iliaca, in which the iliacus internus muſcle is ſituated, and which is the under and lateral part of what ſome call the *great pelvis*.

M Spine or creſt.

N Anterior ſuperior ſpinous proceſs.

O Anterior inferior ſpinous proceſs.

P Point in which the os ilium and os pubis join, and to which the rectus femoris muſcle is attached.

Q Iſchiatic notch.

R Part of its outer ſurface or dorſum; a little below which the bone ends by forming a ſhare of the cotyloid cavity or acetabulum.

Os Iſchii.

S External ſurface of its body carrying a part of the acetabulum.

T Ramus, or proceſs that joins with the os pubis.

U U Tuberoſity

U U Tuberoſity, the loweſt point of its body, and of the trunk of the ſkeleton.

U Spina iſchii of the right ſide.

Os Pubis.

V External ſurface of its body, connected by its anterior end with its fellow, and by its poſterior one completing the acetabulum.

W Its creſt or lip, to which the rectus abdominis muſcle is fixed.

X Ramus, or proceſs that unites with that of the os iſchii, and completes the thyroid hole.

FIG. II.

A front View of the Os Coccygis, ſhewing that it originally conſiſted of ſeveral pieces.

A Anterior ſurface, ſomewhat hollow.

B Upper ſide that joins with the low angle of the os ſacrum ſo as to augment its concavity.

C Its low angle, which is the inferior point of the ſpine, is ſituated about an inch above the anus, and in the ſtanding attitude is nearly in the ſame horizontal plane with the upper part of the os pubis.

General Circumſtances.

a a a a Brim of the cavity encloſed by the os ſacrum, os coccygis, os ilium, os iſchii, and os pubis, called *pelvis*, and by ſome *little pelvis*.

b b Poſterior, or ſacro-iliac ſymphyſis of the pelvis.

c Anterior ſymphyſis, or ſymphyſis pubis.

d Angle or arch of the oſſa pubis.

e Thyroid hole.

f Acetabulum, or cotyloid cavity for the head of the os femoris, formed by the three pieces of the innominatum, in the proportion nearly as marked by the dotted lines.

g g Axis of the pelvis, which forms an angle of about twenty-three degrees with the ſpine or general axis of the body.

h h The courſe of the tendon, called Paupart's ligament.

k Upper edge of the poſterior or broad ſacro-iſchiatic ligament marked by dotted lines that converts the iſchiatic notch into a hole, and extends from the edge of the os ſacrum to the tuberoſity of the os iſchii, leaving a ſmall hole between this and its ſpine for the tendon of the obturator internus.

l Inferior edge of the anterior or ſmall ſacro-iſchiatic ligament which croſſes the other, and is fixed to the ſpine of the os iſchii.

m m Ligaments between the laſt lumbar vertebra and ſpines of the oſſa ilia.

TABLE I.

FIGURE I.

A View of the upper Face of the Atlas or firſt cervical Vertebra.

A The ſpinal hole that tranſmits the ſpinal marrow.

B The articular notch that receives the odontoid proceſs of the ſecond vertebra.

b The direction of the tranſverſe ligament which confines the odontoid proceſs in its place.

C Anterior part that correſponds to the body of the others.

D D The articular cavities that receive the condyles of the occipital bone.

E E Tranſverſe proceſſes which are comparatively large and prominent,

e e Holes in the roots of the tranſverſe proceſſes for the vertebral arteries.

F Spinous proceſs knob-like and ſomewhat forked.

FIG. II.

A front View of the Sternum or Breaſt Bone.

A Upper triangular piece.

B B Notched angles that receive the fore ends of the clavicles.

C Upper edge, a little circular, to enlarge the ſpace intercepted between it and the ſpine.

D D Impreſſions of the cartilages of the firſt ribs.

E E Middle and longeſt portion, which conſiſted originally of three pieces, joined at c c.

F F Impreſſions of the cartilages of the ſecond ribs.

G G Impreſſions of thoſe of the third ribs.

H H Impreſſions of thoſe of the fourth ribs.

I I Impreſſions of thoſe of the fifth ribs.

K K Impreſſions of thoſe of the ſixth.

L L Impreſſions of thoſe of the ſeventh.

M Inferior or enſiform piece.

Fig. III.

A View of a Rib.

A Its head, which is received into one of the vertebral cavities.

B Its tuberoſity, or knob that articulates with the correſponding ſurface on the anterior part of a tranſverſe proceſs of one of the dorſal vertebræ.

C The angle, which in this rib falls near its tuberoſity.

D Sternal extremity, with a hollow to receive the end of the cartilage.

Fig. IV.

A Back View of the Scapula.

A A The ſpine.

B Acromion proceſs, with its articular ſurface for the poſterior end of the clavicle.

C C Cavity above the ſpine in which the ſupraſpinatus muſcle lies.

D D Cavity below the ſpine in which the infraſpinatus muſcle lies.

E E The baſe or ſide turned to the vertebræ, to which the ſerratus magnus is attached.

F Back part of the ſuperior coſta.

G G Inferior coſta.

H Glenoid cavity which articulates with the head of the os humeri.

h h h Brim of the glenoid cavity.

I I Cervix or neck.

K Coracoid proceſs.

L Inferior blunt angle to which the teres muſcles are attached.

M The poſterior angle to which the levator muſcle is fixed.

TABLE K.

A View of the Bones of the Extremities, thoſe of the Thumb and Fingers excepted.

FIGURE I.

A View of the Bones of the Shoulder and Arm.

A The concave or anterior face, that reſpects the ribs in which the ſubſcapularis muſcle lies.

B Acromion proceſs connected with the clavicle.

C Superior coſta; its notch that tranſmits veſſels and nerves is ſeen.

D D Inferior coſta.

E E Baſe to which the ſerratus magnus is attached or reflected ſo as to cover the ſubſcapularis when drawn from its ſituation backwards.

F Anterior angle, in which is the glenoid cavity, containing the head of the os humeri.

G Coracoid proceſs.

H Poſterior angle to which the levator muſcle is tied.

I Inferior angle to which the teres muſcles are fixed.

Clavicle.

K Poſterior end attached to the acromion of the ſcapula.

L Anterior extremity which articulates with the notched angle of the ſternum.

Os Humeri.

M Ball or head, articulated with the glenoid cavity.

N Margin of the ball to which the capſular ligament is fixed, and near it the cervix or neck.

O The innermoſt or ſmall tuberoſity.

P Round body.

Q Internal condyle.

R Trochlea or pulley for articulation with the ulna.

Fig. II.

A View of the Bones of the Fore-arm, Carpus, and Metacarpus.

Ulna.

A Great ſigmoid cavity which receives the pulley ſurface of the os humeri.

B Olecranon.

C Coronoid proceſs into which the tendon of the brachialis internus muſcle is inſerted.

D Its triangular body.

E Inferior extremity touching the carpus.

F Styloid proceſs.

Radius.

G Head of this bone, occupying the ſigmoid cavity of the ulna.

H Cervix or neck.

I Tuberoſity into which the tendon of the biceps is inſerted.

K Its triangular body.

L Interſtice, ſilled nearly by the interoſſeous ligament.

M Expanded inferior end, articulated with the carpus.

Carpus,

N N Anterior concave or hollowed ſurface of the carpal arch.

Metacarpus.

O O O O O Metacarpal bones of the thumb and fingers.

Fig 3rd - A view of the

Femoris & Patella

TABLE L.

A View of the Hand on the Side of the Palm.

FIG. I.

The Carpal Bone.

A Os ſcaphoides.
B Os lunare.
C Os cuneiforme.
D Os piſiforme.
E Os trapezium.
F Os trapezoides.
G Os magnum.
H Os unciforme.
h Unciform proceſs.

The Metacarpal Bone.

I Metacarpal bone of the thumb.
K K K K Metacarpal bones of fingers.
k kk Interſtices which hold the interoſſeous muſcles.

Finger Bones.

L Firſt bone of the thumb.
M Second bone of the thumb.
N N N N Bones of the firſt phalanx of the fingers.
O O O O Bones of the ſecond phalanx of the fingers.
P P P P Bones of the third phalanx.

FIG. II.

A View of the bones of the Foot, on the Side of the Sole.

Tarſal Bone.

A B Aſtragalus.

B Body of the os calcis or heel-bone.

C Scabrous portion which touches the ſurface on which one ſtands.

D Os naviculare os ſcaphoides.

E Os cuneiforme internum.

F Os cuneiforme medium.

G Os cuneiforme externum.

H Os cuboides.

Metatarſal Bones.

I Metatarſal bone of the great toe, thick and bulbous at its anterior extremity, on which the fore part of the foot principally reſts when one ſtands.

K K K K Metatarſal bones of the ſmall toes.

k k k k Interſtices in which are placed the interoſſeous muſcles.

Toe Bones.

L Firſt bone of the great toe.

M Second bone of the great toe.

N N N N Bones of the firſt phalanx.

O O O O Bones of the ſecond phalanx.

P P P P Bones of the third phalanx.

TABLE M.

FIGURE I.

A front View of the Muſcles on the anterior Part of the Body, immediately under the Integuments.

Muſcles on the Skull, Face, and Neck.

A Frontal part of the occipito-frontalis.

B Attollens aurem, lying on the aponeuroſis that covers the upper part of the temporal muſcle.

C Anterior auris.

D Orbicularis palpebrarum, with its tendon adhering to the naſal proceſs of the maxillary bone.

E Levator labii ſuperioris alaeque naſi.

F Levator anguli oris.

G Zygomaticus minor.

H Zygomaticus major.

I Compreſſor naris.

K Depreſſor anguli oris.

L Orbicularis oris.

M Platyſma myoides, with the ſterno-cleido maſtoidæus ſomewhat apparent through it.

Muſcles on the Trunk.

A Pectoralis major.

B B Part of the origin of the ſerratus magnus.

G Edge of the latiſſimus dorſi that forms the poſterior ala or border of the arm pit.

D D Obliquus externus.

E E Linea alba.

F Umbilicus or navel.

G G Linea ſemilunaris.

H H Interſections or tranſverſe lines.

I Ring of the obliquus externus tranſmitting the ſpermatic cord.

K Cremaſter, covering the ſpermatic cord, and reaching to the external ſurface of the coats of the teſticle.

L The teſticle deprived of the integuments.

Muſcles of the ſuperior Extremity.

A Upper and fore part of the trapezius.

B Deltoides.

C C Biceps flexor cubiti, from the low tendon of which the aponeuroſis is cut off.

D Edge of the triceps extenſor cubiti.

E Outer edge of the brachialis internus.

F Supinator longus.

G Pronator teres.

H Flexor carpi radialis

I Flexor ſublimis.

K Extenſor oſſis metacarpi pollicis.

L Extenſor primi internodii.

Muſcles of the inſerior Extremity.

A Tenſor vaginæ femoris.
B Anterior edge of the glutæus maximus.
C Inferior end of the iliacus internus.
D Inferior end of the pſoas magnus.
E Pectinalis.
F Triceps longus.
G Gracilis.
H Upper part of the ſartorius.
I Upper part of the rectus cruris.

FIG. II.

A Rectus femoris.
B Sartorius.
C Triceps longus.
D Gracilis.
E Vaſtus externus.
F Vaſtus internus.
G Tibialis anticus.
H Peronæus longus.
I Extenſor longus digitorum pedis.
K Gaſtrocnemius.
L Solæus.
M Tibialis poſticus.
N Ligamentum tarſi annulare.
O Abductor policis pedis.

TABLE N.

A View of the Muſcles that appear when thoſe repreſented in the former Tables have been removed.

FIGURE I.

Muſcles on the Skull, Face, and Neck.

A Corrugator ſupercilii.
B Temporalis.
C Maſſeter.
D Levator anguli oris.
E Buccinator.
F Orbicularis oris.
f Naſalis labii ſuperioris of Albinus.
G Depreſſor labii inferioris.
H Sterno-cleido-maſtoidæus.

This muſcle is divided in the operation for the wry-neck.

I Sterno-hyoidæus.
K Omo-hyoidæus.
L Hyo-thyroidæus.
M Levator ſcapulæ.

Muſcles on the Trunk.

A Subclavius.
B Pectoralis minor.
C C Serratus magnus.
D D Rectus abdominis with its tendinous interſections.

E Pyramidalis.

F Obliquus internus.

G Cremaſter muſcle extended along the ſpermatic chord and going off from the obliquus externus.

Muſcles of the ſuperior Extremity.

A Biceps flexor cubiti.

a Its ſhort head.

b Its long head.

B Coraco-brachialis.

C Under portion of the brachialis internus.

D Edge of the triceps extenſor cubiti.

E Extenſor carpi radialis longior and brevior.

F F Extenſors of the thumb.

G Flexor ſublimus perforatus.

Muſcles of the inferior Extremity.

A Inferior part of the iliacus internus.

B Inferior part of the pſoas magnus.

C Pectinalis.

D Origin of the rectus cruris, the reſt being cut off.

E Anterior edge of the glutæus medius.

FIG. II.

A Cruræus with its tendinous ſurface to favour the motion of the Rectus femoris that lies upon it.

B Vaſtus internus.

C Vaſtus externus.

D Low tendon of the rectus adhering to the patella, and continued over this bone to the tibia.

E Triceps longus.

F Gracilis.

G Tendons of the gracilis and ſemitendinoſus.

H Tendon of the biceps flexor cruris.

I Peronæus longus.

K Bodies of the extenſor digitorum communis on the middle, and of the peronæus tertius on the outſide, and of the extenſor proprius pollicis on the inſide.

L Edge of the ſolæus.

M Edge of the flexor longus digitorum.

N Tendons of the tibialis poſticus and flexor longus digitorum.

O Flexor brevis digitorum.

TABLE O.

A View of the Muſcles that appear when thoſe repreſented in the former Tables have been removed.

FIGURE I.

Muſcles on the Face and Neck.

A Broad tendon of the abductor oculi, oppoſite to which is that of the adductor.

B Broad tendon of the levator oculi, oppoſite to it is that of the depreſſor oculi.

C Trochlea and part of the tendon of the obliquus major.

D Obliquus minor.

E Depreſſor labii ſuperioris.

F Orbicularis oris.

G Buccinator, behind which a ſmall ſhare of the pterygoidæus externus is ſeen, within the coronoid proceſs of the lower jaw.

H Levator labii inferioris.

I Sterno-thyroidæus.

K Hyo-thyroidæus.

L Scalenus anticus.

M Scalenus poſticus.

In the interſtice between theſe the brachial artery and nerves are tranſmitted.

N A portion of the trachelo-maſtoidæus.

O Rectus capitis anterior.

Muſcles

Muſcles on the Trunk.

A A, *&c.* Anterior portions of the external intercoſtal muſcles.

B B, *&c.* Anterior portion of the internal intercoſtal muſcles.

C Tranſverſalis abdominis, in contact with the peretonæum.

D Part of the tendon of the tranſverſalis, from which that which paſſes before the rectus and pyramidalis is cut off.

E E Part of the tendon of the tranſverſalis that paſſes behind the rectus to join its fellow in the linea alba.

F The anterior lamella of the tendon of the internal oblique muſcle that joins the tendon of the external oblique, to paſs before the rectus to the linea alba: this has been removed from the oppoſite ſide.

G G The poſterior lamella of the tendon of the internal oblique.

H Umbilicus.

I Upper part of the ſpermatic cord without the cremaſter.

Superior Extremity.

A Subſcapularis.
B Teres minor.
C Coraco-brachialis.
D Brachialis internus.
E Brachialis externus.

F Extenſor carpi radialis longior.
G Extenſor carpi radialis brevis.
H Edge of the ſupinator radii teres.
I Flexor digitorum profundus.

Inferior Extremity.

A Glutæus minimus.
B Iliacus internus.
C Pſoas magnus.
D Obturator externus.
E Adductor brevis, or ſhort head of the triceps.
F Adductor magnus, a part of the triceps.
G Gracilis.

FIG. II.

A Under part of the adductor brevis.
B Under part of the adductor longus.
C Under part of the adductor magnus, between which and the former the crural artery paſſes to the ham.
D Gracilis.
E Inferior end of the biceps cruris.
F F Thigh bone.
G The patella naked; the capſular ligament being removed.
H Scabrous portion on the head of the tibia on which one kneels.
I I Edges of the ſemilunar cartilages included in the capſular ligament.

K Peronæus longus.

L Peronæus brevis.

M Tibialis poſticus.

m Its tendon lodged behind the inner ankle.

N Extenſor digitorum brevis communis; between its tendons the external interoſſeous muſcles appear.

TABLE P.

A View of the Muſcles that appear after thoſe repreſented in the former Tables have been removed.

FIGURE I.

Muſcles on the Face and Neck.

A Levator oculi.
B Adductor oculi.
C Abductor oculi.
D Depreſſor oculi.
E Obliquus major.
F Obliquus minor.
G Pterygoidæus internus.
H Obliquus ſuperior capitis.
I Scalenus medius.
K Longus colli.

Muſcles on the Trunk.

A A A Internal intercoſtals.
B B The diaphragm.
C Pſoas parvus, with its tendon ſtretching to the os pubis.
D Quadratus lumborum.

Muſcles of the ſuperior Extremity.

A Subſcapularis.
B Supinator brevis.

Muſcles of the inferior Extremity.

A Pſoas magnus.
B Iliacus internus.
C Obturator externus.
D Pectinalis.
E Section of the corpora cavernoſa penis and urethra.

FIG. II.

A Adductor brevis.
B Adductor longus.
C Adductor magnus.

Theſe three muſcles are called triceps femoris.

D Tibialis poſticus.
E Peronæus brevis.

TABLE Q.

A View of the Muſcles on the back Parts that appear when the Integuments have been removed.

FIGURE I.

Muſcles on the Head, Neck, and Trunk.

A Back part of the occipito-frontalis.
B Attollens aurem.
C Anterior auris.
D Retrahentes aurem.
E Back part of the orbicularis oculi.
F Zygomaticus major.
G Maſſeter.
H Sterno-cleido-maſtoidæus.
I I I Trapezius or cucularis.
i i Tendinous portion of the trapezius, called ligamentum nuchæ.
K K K Latiſſimus dorſi
k k Tendon of the latiſſimus dorſi.
L Part of the obliquus externus abdominis.

Muſcles of the ſuperior Extremity.

A Deltoides.
B Infraſpinatus.
C Teres minor.
D Teres major.
E Triceps extenſor cubiti.

F Anconæus.

G Supinator radii longus.

H Extenſor carpi radialis longior.

I Extenſor carpi radialis brevior.

K Extenſor digitorum communis, ſending its four tendons under the annular ligament to the backs of the four fingers.

L Extenſor oſſis metacarpi pollicis.

M Extenſor primi internodii pollicis.

N Extenſor ſecundi internodii pollicis.

O Extenſor carpi ulnaris.

P Edge of the flexor ſublimis.

Q Flexor carpi ulnaris.

R Part of the flexor profundus.

Inferior Extremity.

A Glutæus maximus.

B Upper part of the glutæus.

C Edge of the tenſor vaginæ femoris.

FIG. II.

A Under part of the glutæus maximus.

B Vaſtus externus.

C Gracilis.

D Long head of the biceps flexor cruris.

E Short head of the biceps flexor cruris.

F Semitendinoſus.

G Semimembranoſus.

H Part of the adductor magnus.

I Edge of the vaſtus internus.

K K Gaſtrocnemius.

L Edge of the ſolæus.

M Tendo Achillis with the tendon of the plantaris on the inſide.

N Peronæus longus.

O Peronæus brevis.

P Flexor digitorum longus.

Q Tendon of the peronæus tertius, or nonus Veſalii.

R Tendons of the extenſor digitorum longus.

S Abductor minimi digiti pedis.

Fig. 1

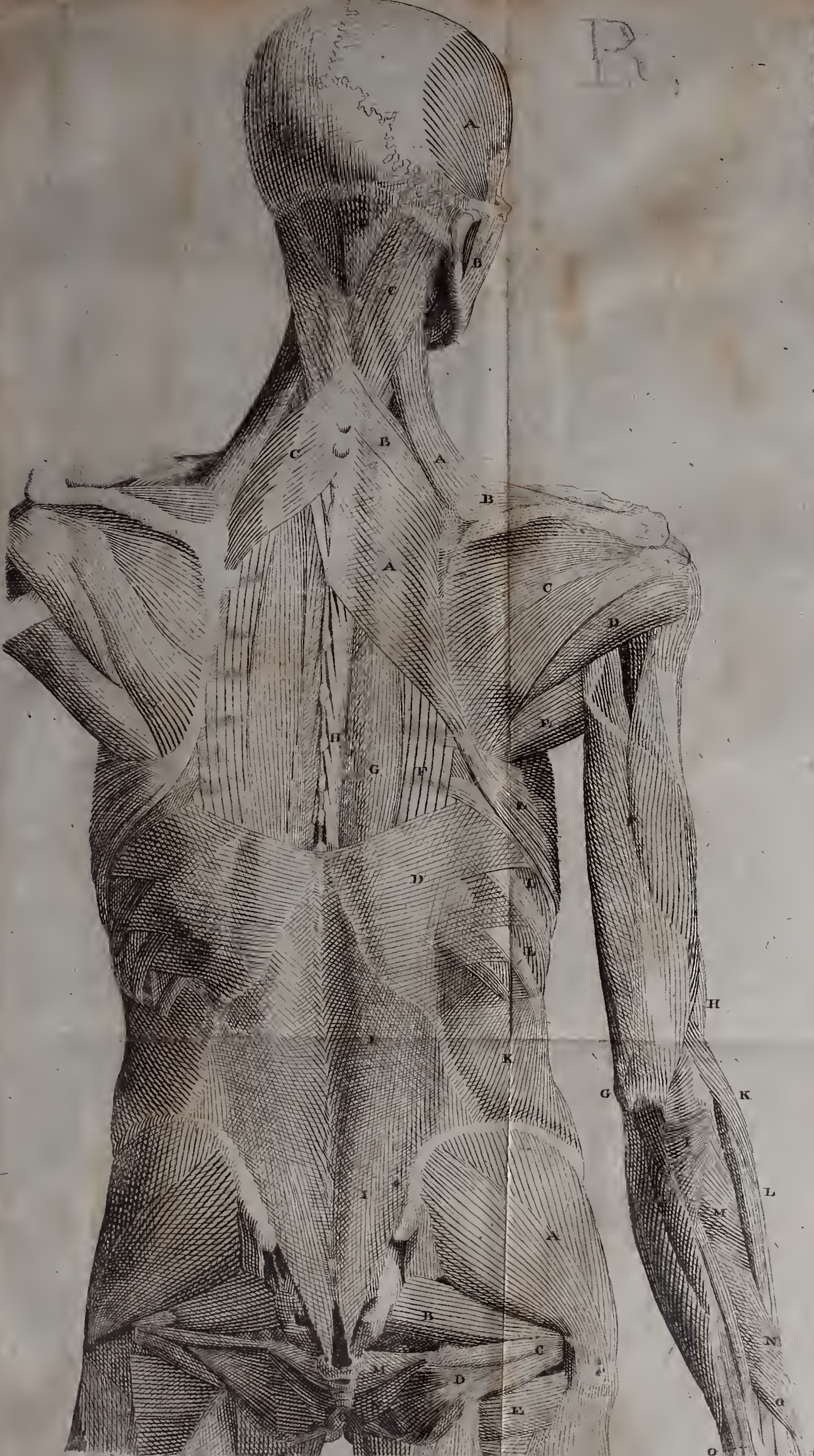

Fig. 2

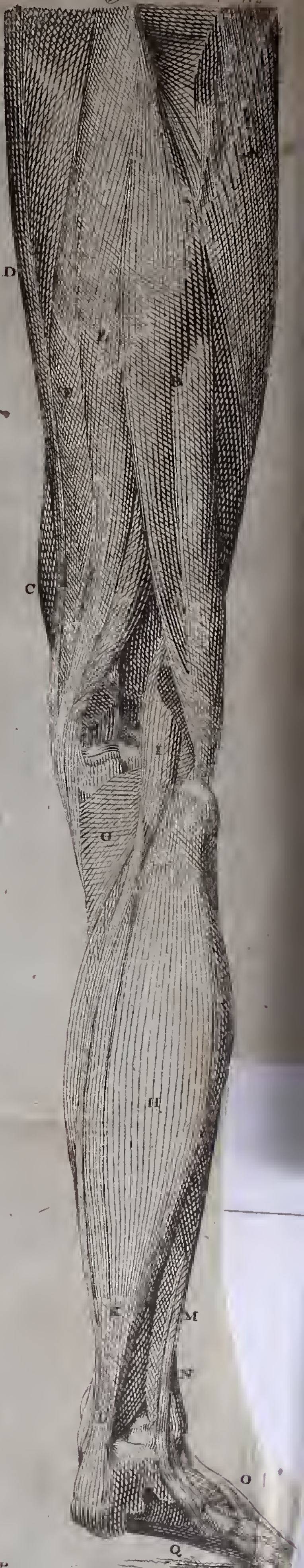

TABLE R.

A View of the Muſcles on the back Parts after thoſe repreſented in Table Q have been removed.

FIGURE I.

Muſcles on the Head and Neck.

A Temporalis from which the covering aponeuroſis has been cut off; the under part paſſes the zygoma to the coronoid proceſs of the under jaw.

This is often wounded in trepanning.

B Maſſeter.

C Splenius.

D Upper part of the complexus.

Muſcles on the Trunk.

A Rhomboides major.

B Rhomboides minor.

C Serratus poſticus ſuperior of the left ſide.

D Serratus poſticus inferior.

E Under part of the ſerratus magnus.

F Part of the ſacro-lumbalis.

G Part of the longiſſimus dorſi.

H Part of the ſpinalis dorſi.

I I Broad tendon of the longiſſimus dorſi, from which that of the ſerratus poſticus inferior is inſeparable.

K Back part of the obliquus internus.
L L External intercoſtals.
M Caccygæus.
N Levator ani.
O Sphincter ani.

Muſcles of the ſuperior Extremity.

A Levator ſcapulæ.
B Supra-ſpinatus.
C Infra-ſpinatus.
D Teres minor.
E Teres major.
F Triceps extenſor cubiti.
f Long head.
f f Short head.
G Part of the third head of the triceps named brachialis externus.
H Edge of the brachialis internus.
I Anconæus.
K Extenſor carpi radialis longior.
L Extenſor carpi radialis brevior.
M Supinator radii brevis.
N Extenſor oſſis metacarpi pollicis.
O Extenſor primi internodii pollicis.
P Extenſor ſecundi internodii pollicis.
Q Indicator.
R Flexor carpi ulnaris.

Muſcles of the inferior Extremity.

A Glutæus medius.
B Pyriformis.

C Gemini.

D Tendon of the obturator internus which paſſes between, and is concealed by the gemini on its way to the root of the trochanter major.

E Quadratus femoris.

F Upper part of the vaſtus externus.

FIG. II.

A Vaſtus externus.

B Biceps flexor cruris.

C Small ſhare of the vaſtus internus.

D Gracilis.

E Semitendinoſus.

F Semimembranoſus.

G Poplitæus.

H Solæus.

I Plantaris, with its long tendon.

K Remainder of the tendon of the gaſtrocnemius.

L Tendo Achillis with that of the plantaris.

M Peronæus longus.

N Peronæus brevis.

O Tendons of the extenſor digitorum pedis.

P Tendon of the peronæus tertius.

Q Flexor brevis minimi digiti pedis.

TABLE S.

A View of the Muſcles on the back Parts after thoſe repreſented in Tables Q and R have been removed.

FIGURE I.

Muſcles on the Head and Neck.

A Back part of the buccinator.
B Complexus.
C Trachelo-maſtoidæus.
D Scalenus medius.
E Scalenus poſticus.

Muſcles on the Trunk.

A Spinalis dorſi,
B Longiſſimus dorſi.
C Sacro-lumbalis.
D Multifidus ſpinæ, ſeen obſcurely.
E Semiſpinalis dorſi.
F Tranſverſalis abdominis.

Muſcles of the ſuperior Extremity.

A Teres major.
B Part of the caraco-brachialis.
C Part of the brachialis internus.
D Brachialis externus, or third head of the triceps extenſor cubiti.
E Extenſor carpi radialis longior.

F Extenſor carpi radialis brevior.
G Flexor profundus.
H Supinator radii brevis.

Muſcles of the inferior Extremity.

A Glutæus minimus.
B Obturator internus.
C Tendon of the obturator externus.
D Upper part of the gracilis.
E Upper part of the ſemimembranoſus.
F Upper part of the adductor longus.

FIG. II.

A A Gracilis.
B Adductor longus.
C Semimembranoſus.
D Short head of the biceps flexor cruris.
E E Origin of the two heads of the gaſtracnemius.
F Origin of the plantaris.
G Poplitæus.
H Tibialis poſticus
I Flexor longus digitorm pedis.
K Flexor pollicis longus.
L Peronæus longus.
M Peronæus brevis.
N Flexor brevis digitorum pedis.
O Part of the tendon of the flexor longus digitorum pedis.

TABLE T.

A View of the Muſcles that appear after thoſe ſeen in the former Tables have been removed.

FIGURE I.

Muſcles on the Neck.

A Rectus capitis poſticus minor.
B Rectus capitis poſticus major.
C Obliquus capitis ſuperior.
D Obliquus capitis inferior.
E Scalenus medius.
F Spinalis colli.

Muſcles on the Trunk.

A Semiſpinalis dorſi
B B, *&c.* Multifidus ſpinæ.
C C, *&c.* Levatores coſtarum breviores.
D D Levatores coſtarum longiores.
E E, *&c.* Intercoſtales externi.
F Quadratus lumborum.
G G, *&c.* Intertranſverſalis lumborum.

Muſcles of the ſuperior Extremity.

A Subſcapularis.
B Supinator brevis.
C Pronatur quadratus.

Muſcles on the inferior Extremity.

A Iliacus internus.
B Obturator externus.
C Tendon of the pſoas magnus.

FIG. II.

A A Adductor magnus.
B Tibialis poſticus.
C Peronæus brevis.

TABLE U.

A View of the Arterial Syſtem,---by HALLER.

FIG. I.

The thorax and abdomen are opened by the removal of the anterior portion of the including parts; and the contained organs are removed as far as is neceſſary.

A The body of the heart, containing the ventricles.

a a a The coronary arteries beautifully ſerpentine.

B The right auricle, in which the venæ cavæ terminate.

C The left auricle in which the four pulmonary veins end.

cc The trunks of the two left pulmonary veins, ending in the auricle

D The trunk of the pulmonary artery, going out from the right ventricle to be diſperſed through the lungs.

E The trunk of the aorta aſcending from the left ventricle.

F The arch or curvature of the aorta, from which three great branches go off in an upward direction.

f The ductus arterioſus, or communication between the trunks of the pulmonary artery and aorta, which is pervious only in the fœtus.

G The right trunk that goes off from the arch of the aorta.

I The right ſubclavian artery.

K The right carotid trunk.

The ſubclavian ſends off,

L The vertebral artery, tranſmitted through the holes in the tranſverſe proceſſes of the cervical vertebræ, to the poſterior part of the brain.

M The ſcalenus anticus muſcle, attached to the firſt rib, behind which the ſubclavian artery paſſes, and takes the name of axillary artery.

O The middle trunk, or left common carotid artery, that ariſes from the curvature of the aorta.

P The left ſubclavian artery, that having paſſed behind the ſcalenus anticus muſcle becomes axillary artery.

Q Q, &c. The intercoſtal arteries, on each ſide the ſuperior come from the ſubclavian ones.

R R, &c. The lumbar arteries, analogous to the intercoſtal ones.

S The cœliac artery, that divides into hepatic, gaſtric, and ſplenic, immediately below the diaphragm.

T The ſuperior meſenteric artery.

U U The kidnies.

V V The renal glandules (capſulæ renales).

W W The renal or emulgent arteries (of which there are ſometimes two on one ſide) going to the kidnies, and ramifying before entering their ſciſſures

Above the renal or emulgent arteries two ſmall branches are ſent off to the renal capſules.

X The ſpermatic arteries which go to the ovaria in the female, and to the teſtes in the male.

Y Inferior meſenteric arteries.

a a The common iliac arteries.

b b The external iliac arteries.

c c The ilio-lumbar arteries.

d The right epigaſtric artery.

e e The bottom (fundus) of the bladder of urine, with the ureters lying behind it.

f The inteſtinum rectum.

g g The internal iliac or hypogaſtric arteries, that ſend off various large branches to the parts within and near the pelvis, viz. the genitals, &c.

h h The ſmall iliac arteries.

The Face and Neck.

A The trachea.

B The larynx or upper part of the trachea.

C The thyroid gland, divided into two lobes, lying on the lateral and under part of the larynx.

D D Inferior thyroid arteries.

E E Internal carotid arteries that paſs through their proper holes to the brain.

F F External carotid arteries.

G G Superior thyroid arteries, ariſing from the external carotids.

H Maxillary gland.

I I Facial arteries ariſing from the external carotids; the left one partly covered by the maxillary gland.

Theſe, in a ſerpentine courſe, incline to the angles of the mouth reſpectively, and running along the lips in the ſame diſpoſition anaſtomoſe under the name of labial arteries.

Theſe ſend branches to the ſeptum and ſides of the noſe that join with the arteries of the forehead, near the inner angles of the eye-lids, under the name of angular arteries.

K Parotid gland of the right ſide.

L Trunk of the temporal artery lying before the ear, ſeen by removing the parotid gland.

This ſends off from its upper part two principal branches,---the frontal and temporal arteries.

Superior Extremities.

A Axillary artery of the right ſide.

B Internal ſcapulary artery to the axillary glands, &c.

C Beginning of the brachial artery, ſending inwards the branch called humeral.

From this to the flexure of the arm, various collateral branches ariſe.

D The trunk of the brachial artery, a little below the flexure of the elbow.

E Radial artery.

F Ulnar artery.

G Internal interoſſeous artery.

FIG. II.

A view of the Arteries of the lower part of the Trunk, and fore part of the lower Extremities.

A Part of the body of the urinary bladder.

B Inferior part of the right ſpermatic artery going to the teſticle.

C Some of the inguinal glands.

D Crural artery, which is a continuation of the external iliac one cut off.

E Arteria profunda, beſtowed on the upper and outer part of the thigh.

F The trunk of the crural artery, as it paſſes backwards between the triceps longus and the bone, to reach the ham, under the name of popletæal artery, which gives off the anaſtomoſing branches that ſurround the knee joint.

G G The anterior tibial artery, (tibialis antica) after giving off numerous branches, ſupplying the upper part of the foot.

Fig. 1.

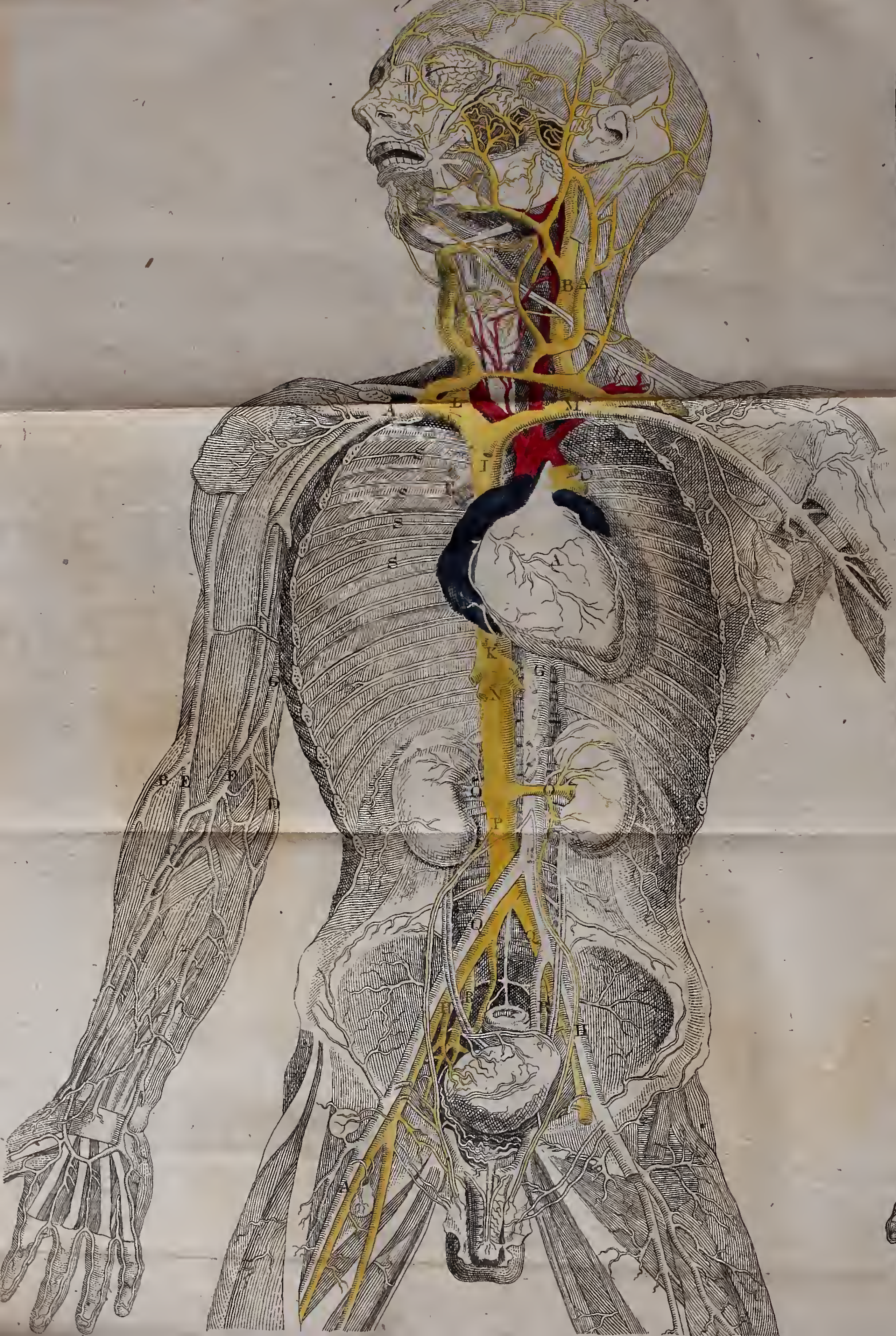

Fig. 2.

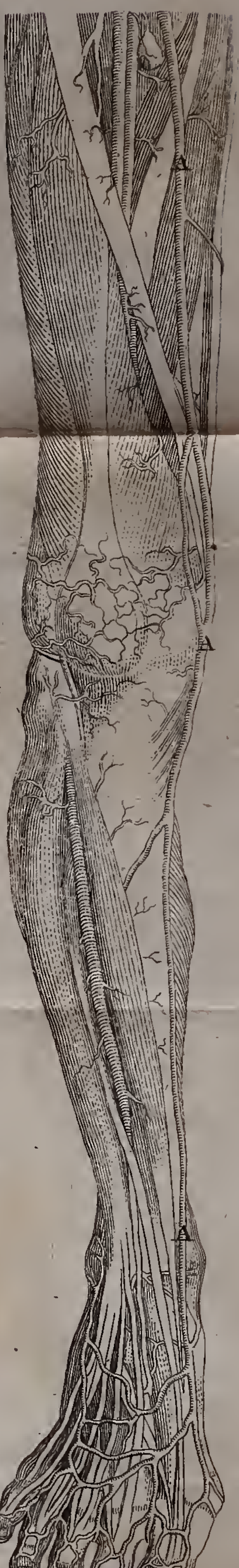

TABLE V.

FIG. I.

A view of the Venous and Arterial Syſtems,— by MEYERS.

The Trunk.

A The heart with the coronary veſſels.

B The right auricle.

C The angle of the left auricle.

D The pulmonary veins of the left ſide, going into the auricle.

E The pulmonary veins of the right ſide, alſo going into the left auricle.

F The arch of the aorta.

G Aorta deſcendens.

H H Iliac arteries.

I The ſuperior vena cava about to end in the right auricle.

K Inferior vena cava, tending to the ſame auricle.

L Right ſubclavian vein.

M. Left ſubclavian vein, longer than the right one.

N The terminations of the hepatic veins immediately behind the liver, and below the diaphragm.

O O The emulgent veins.

P P The ſpermatic veins, the left one ending in the left emulgent; a little below they are aſſociated with the ſpermatic arteries, going to the teſtes.

Q Q Common iliac veins.

R R Internal iliac veins.

S S, &c. Intercoſtal veins; they fall into vena azygos.

The Head and Neck.

A A External jugular veins, at their bottoms anaſtomoſing by a croſs branch, and terminating in the ſubclavian veins.

B B Internal jugular veins communicating with the external ones, and ending in the ſubclavian veins.

Superior Extremity.

A Axillary vein.

B Cephalic vein below the flexure of the elbow, which, continued upwards, ends in the external jugular vein.

C Median vein.

D Baſilic vein.

E Median cephalic vein.

F Median baſilic vein.

G Trunk of the baſilic vein on its way to become axillary, &c.

Inferior Extremity.

A Crural vein.

FIG. II.

A A A The vena ſaphæna, the principal ſuperficial vein of the leg, aſcending to the crural one below the groin.